

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—25TH YEAR.

SYDNEY, SATURDAY, MARCH 11, 1939.

No. 10.

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—	Page.	NAVAL, MILITARY AND AIR FORCE—	Page.
The Charles MacKay Lecture, by SIR ROBERT WADE, M.D., Ch.M., F.R.C.S., F.R.A.C.S.	371	Appointments	406
Some Aspects of Operations for Internal Derangements of the Knee Joint, by E. F. WEST	380	OBITUARY—	
"Pentothal Sodium" Anaesthesia: A Review, with an Analysis of 333 Cases, by S. V. MARSHALL, M.B., Ch.M., D.A. (R.C.P. and S.)	382	Edmund Bruce Mortimer Vance	406
Non-Union of the Carpal Navicular Bone, by F. H. MCC. CALLOW	391	Walter Blaxland	408
		Walter Charles Mansfield	408
REPORTS OF CASES—		POST-GRADUATE WORK—	
Apparent Cure in a Case of Subacute Bacterial Endocarditis, by F. E. WELCH, M.B., B.S., and A. R. SOUTHWOOD, M.D., M.S., M.R.C.P. . . .	392	Week-End Course at Tamworth	408
REVIEWS—		CORRESPONDENCE—	
Surgery for Every Day	394	The Syme Memorial Lecture	408
A Doctor in the Backblocks	394	Drainage in Acute Appendicitis	408
LEADING ARTICLES—		The British Medical Association in Australia . .	409
Prognosis	395	MEDICAL PRIZES—	
CURRENT COMMENT—		The Hunterian Society Gold Medal for Practitioners	409
Radium Beam Therapy	396	PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—	
The Victorian Department of Mental Hygiene . .	398	New South Wales	409
Hepatitis	399	NOTICE	409
ABSTRACTS FROM CURRENT MEDICAL LITERATURE—		NOMINATIONS AND ELECTIONS	410
Medicine	400	DIARY FOR THE MONTH	410
BRITISH MEDICAL ASSOCIATION NEWS—		MEDICAL APPOINTMENTS	410
Scientific	402	MEDICAL APPOINTMENTS VACANT, ETC.	410
The Katherine Bishop Harman Prize	405	MEDICAL APPOINTMENTS: IMPORTANT NOTICE	410
		EDITORIAL NOTICES	410

The Charles MacKay Lecture.¹

By SIR ROBERT WADE, M.D., Ch.M., F.R.C.S., F.R.A.C.S.,
Sydney.

FIRST of all may I say how I appreciate the honour that has been accorded me in my being allowed to give this, the annual memorial address in honour of the late Charles MacKay.

Charles MacKay was, together with his descendants, a striking example of the influence of heredity; the finer side of human character was strongly in evidence in his forbears, in him and in his descendants. His mother, Margaret McDiamid, is still remembered in her Highland home; a woman of striking personality, she was widely known and

her name is still held in reverence for the spiritual influence she wielded in the MacKay country of Caithness and Sunderlandshire.

Charles MacKay, steadfast to his creed when the great struggle was going on in Scotland between Church and State, and unwilling to be suborned into a subservience he felt was false, emigrated to Australia at the age of forty-six years. A "dominie" in Scotland, he carried his profession to this country, and was schoolmaster at Kilmore until his death in 1863 at the age of fifty-seven years.

A man of high ideals, he was willing to sacrifice all his home ties and interests to maintain his standard of ethics and freedom of conscience, and there is no doubt that the example of a deeply religious, honest and straightforward man must have had its share in guiding those, especially the youths, with whom he had much to do in this country.

¹ Delivered at the Australian Institute of Anatomy, Canberra, on September 28, 1938.

His grandson, whom we all knew so well, was Sir Colin MacKenzie. Colin MacKenzie recently presided over the work in this very building, and was responsible for its being. Here he well carried out the traditions of service of his family. He was a man of wide outlook, as may be seen by the establishment of the Museum of Comparative Anatomy and by his work, especially on the comparative anatomy of Australian fauna, for which he was known the world over. Perhaps the best word to use in relation to him is "vision" in its sense of foresight, and ability to think out the implication of his studies and of his work. He was not a mere plodder, carrying out routine work, but was quick to see the correlation of the details discovered by himself and others, and to come to a clear, reasoned decision as to their relative value.

It was thus that he introduced new methods and new guiding principles in the treatment of infantile paralysis; his mechanical ingenuity, too, allowed him to have manufactured new types of splints or adaptations of old ones, and of new materials; and these have not, since the days when he was interested in the subject—now some thirty years ago—been improved upon.

Australia in general, and Canberra in particular, must mourn in his recent death the loss of one of our great men.

THE PRE-SCHOOL CHILD.

The subject that I have chosen for my address tonight is that of "the pre-school child". The term "pre-school child" is purely arbitrary, and is applied to children between the time when the influence of the baby health centres comes to an end, that is, at the age of two years, and the time when they go to school, which may be anywhere from five to seven years. It is during this period of his life that the child emerges from the chrysalis and that such things as muscular control, intelligence and thought and inquiry really begin and help to mould the child in his later life.

Pre-school children are left entirely in the charge of their parents or of nurses or nursemaids; no preliminary education has been given to any of these—in fact, there is as yet little exact information available for the guidance of parents in their treatment of children during that age. Yet it is a most important age. It is needless, perhaps, to quote the old line from Wordsworth in which he epitomizes in a few words what so many others have tried to say before, but never quite so concisely: "The child is father of the man." Milton puts it:

... the childhood shows the man
As morning shows the day.

The pre-school age is particularly a formative period, and there is no reason why the same skilled care should not be given to children of this period as to babies and school children.

We must acknowledge that there is at present a gap in the care of the child, caused a great deal by

our lack of knowledge and also by the lack of facilities to disburse what little knowledge we do possess. There is need for this gap to be bridged and also for some research, both into what is needed and into how that knowledge, when obtained, may best be distributed.

Parents, by virtue of their parenthood, are supposed to know all about the upbringing of their children. What nursemaids are supposed to know, I have no idea; on the whole, they have no very great degree of intelligence—perhaps this is why they elect to be nursemaids.

It is very easy for the outsider to criticize destructively anything in which he is not directly concerned, and so it would be easy to ask whether our education is carried out on the right lines, and whether during some period of our education we should not receive some training in what will be demanded of us during our life's work. Woman, for example, should be taught something about the domestic life and the care of her children. I think we can lay it down quite definitely that there is no training given at all, either to the child or to the young adult, in the completely domestic side of life, which includes both the upkeep of the household and the care of the children. Certainly domestic science is now being taught at school; but there is no training given at all, either in the dieting, feeding and care of babies, or at a later stage in child psychology or nutrition. And I do think that this omission is a very distinct blot on our system of education. After all, the family is the whole unit of social life, and training in its needs and difficulties should be given to the young person entering that sphere of life.

Times are changing, and rapidly. The number of children in a family is becoming less, flat life is increasing, women are entering the business and political side of life; perhaps the next fifty or a hundred years may see a matriarchal form of government. Even so, the woman must still bear the child and feed it for the first year, though in the days to come the care of the baby may be relegated to others in organized nursery schools.

Let me repeat: the mother comes into the particular care of her child quite untrained, and with absolutely no knowledge as to her duties as a mother. In her whole previous life she has ignored the subject, except that she may have gleaned something from association with younger brothers and sisters when she is a member of a large family; and all that she does know then or afterwards is a matter of self-training, with no expert knowledge to guide her.

I should not like to say at what stage of life education in home needs should be given, whether in the latter years of school life or as a form of post-graduate training; but I am sure that any young person who embarks on married life untrained to look after a family will, when first undertaking such work, make a very poor hand of it, and the reaction will be in the child.

Nursery Schools as a Remedy.

I trust I have made it clear that there is a need for some organization to bridge the gap at present existing between the baby health centres and the school time. This is done to some small extent by day nurseries and kindergartens. There are, in Sydney, under the Kindergarten Union, sixteen schools and kindergartens and two nursery schools, and under the Day Nursery and Nursery Schools Association, seven day nurseries, including five nursery schools. There are in New South Wales 167,000 children of pre-school age, of whom only 2,000 are cared for by these organizations. But there should be something on a very much bigger scale and all existing organizations should be closely coordinated to it.

The parent, all untrained, with multifarious other duties, is unable to carry out the early training of the child to the best advantage. The mother has all day of it, and to the youngster the day becomes a series of "don'ts" and repressions. For this reason nursery schools have been adopted; they serve as training grounds for the parents and as a break and rest from the day's work for them. Unfortunately, advantage is not taken of them to any great extent, they are not used enough, nor are there enough of them.

There is still a great deal to be learnt, not only on the medical and nutritional sides, but on that of general management. I understand from Dr. Cumpston that the Commonwealth Advisory Council on Nutrition has recommended the formation in each of the large cities of a model nursery school which would carry out research into the principles of management of children. Such a school would be a training centre for the heads of similar schools, and would act as a model on which other schools could be established. Dr. Clements, in his report, recommends that a nutritional and research centre should be installed in connexion with a large children's hospital; and that such a centre, in addition to being a site for research work on the errors of nutrition that might be found either at nursery schools or in hospital patients, would act also as a post-graduate training school for young medical men who wished to undertake work in the field and become medical officers to nursery schools.

Might I describe to you my idea of a welfare scheme for the children during this period. There should be a series of nursery schools, scattered throughout the State, which would have to be maintained by the State Government. There should also be in each State one or more model and research training schools which, in addition to doing the work for the children who attend it, would act as a training school for teachers and heads of such nursery schools.

Such a nursery school has many functions. First of all it cares for the children who attend it in the matters of health, food and cleanliness, in the acquisition of regular habits, and in the guiding of the children's mentality and in the allowing of free scope to their intelligence. It would also act as a

training school for nurses and nursemaids, and would be part of the practical training of the future teachers of such schools. It would act as an advisory and training ground for the parents, to which they could take their problems, and would also relieve the mother of the care of the child during part of the day. Some trained medical men should be attached to the nursery school; in the model school skilled pædiatricians attached to a large children's hospital would advise on all medical care. There should be a dietitian who had had experience at a nutritional centre of a children's hospital, and there should be a children's mental expert who could gauge the intelligence of the children.

In addition to doing the routine work of a nursery school, the model school would act as a centre for research and a training school for teachers who would be trained as heads of other schools.

A model nursery school would need to be in close relationship with a children's hospital for preference; and also from the mental side it should be in close association with child guidance clinics.

Then there should be a nutritional investigation bureau attached to a children's hospital where there is an adequate pathology department which could be utilized. In charge of this bureau there would need to be one or more skilled children's physicians working in relationship with the pathologists and biochemists in the department. The bureau would act as a research centre on any nutritional problem of children of any age. It would also act as a post-graduate school to train younger medical men for their work, in which, as general practitioners, they would be brought in contact with baby health centres or nursery schools throughout the country.

There should be a federal central bureau to govern the scheme for model nurseries, if such an arrangement could be made under our present form of government. This would act as a centre of collect and collate all the work done elsewhere in the world and to distribute it to the interested organizations; it would also act as a publicity centre to interest and inform the public.

I have only one fear that such a new formation would fail in certain respects—that is, in the tendency that must exist in such organizations (as it already exists to some extent in the infant welfare centres and the schools for older children) to become too stereotyped and standardized, and to look after children in the mass instead of as individuals. Such an organization certainly would be for the greatest number, and so it would justify itself; but it should also be elastic enough to cope with that small element that must occur—the misfits, the few who do not conform to the general type, those with some unusual temperament and intelligence.

Medical Problems.

What are the medical problems of children of this age? First come those resulting from malnutrition in babyhood. We find the aftermath of poor feed-

ing in the early days of life in decaying teeth of the first dentition, with deficient deposit of enamel; furthermore, decay of the first teeth, with perhaps their early loss, has some definite effect on the character of the second teeth. There are the after-effects of rickets in such deformities as bow-legs, knock-knee and pigeon-chest.

Again, it is at this period of life that children are particularly susceptible to infectious diseases—diphtheria, measles, scarlet fever, rheumatism, whooping cough and infantile paralysis. Up till then, the children have enjoyed a certain amount of protection as a result of protective bodies ingested with the mother's milk. Now, they have to fend for themselves, and they are particularly liable to infection by any of these particular diseases that may be prevalent. Owing to the different methods by which statistics are gathered in the several States, some of the diseases being notifiable and others not, I cannot give all the figures; but we find the following: For the whole of Australia in 1936 there were 274 deaths from diphtheria, 18 from scarlet fever, 248 from whooping cough, and 21 from measles. In 1937-1938 there were 234 deaths from infantile paralysis. Though these figures show the deaths that may follow these diseases, they give no indication of the after-effects that will leave their mark on the general health for years, probably through life.

Diphtheria, scarlet fever, measles and whooping cough are all associated with some affection of the upper part of the respiratory tract, and, as you know, connected with our throat and nose are various air sinuses which may become infected during the acute stages of these diseases and leave trouble. For instance, in connexion with the throat there is a tube leading to the ear which, when affected, may cause discharging ears and mastoid trouble, and not only occasion acute illness or even death, but often leave permanent damage and deafness.

Again, it is not uncommon for infections of other sinuses to occur during these acute respiratory conditions, and they in turn may persist, leading to permanent ill health in many cases, and even to some permanent form of chest trouble.

Infantile paralysis is well known to you at the moment, for we have just come through a heavy epidemic of it, the greatest that Australia has yet known. Occurring last year, and running into about April of this year, there were in the Commonwealth 4,304 cases distributed as follows:

Victoria	2,099
Queensland	160
New South Wales	704
South Australia	341
Tasmania	997
Federal Capital Territory	3

In all, 234 deaths occurred; but it is not only the mortality rate (which for some reason in this epidemic was much lower than usual) but the after-effects of the disease, the paralysis, that make it feared.

Of all those patients, 2,000 were left with some paralysis, and at least 1,000 will be permanently affected and will always be a drain, both on the public and on their parents.

It is at this age that manifestations of what are called septic or enlarged tonsils and adenoids first appear. These manifestations have in most cases been due to some previous infection of the throat, and are often associated with some sinus trouble. Infected tonsils and adenoids cause their damage partly by the poisoning that results, and partly by their enlargement, which causes interference with breathing.

This goes on in its turn to lead to middle ear or discharging ear trouble, to deafness and maldevelopment of the chest and lungs. In fact, we can say that these children with enlarged tonsils and adenoids are always below par in health, that their skeletal and muscular growth is so altered that they cannot assume a healthy, erect attitude. In short the presence of enlarged tonsils and adenoids is often the beginning of the round-shouldered, pigeon-chested condition of a man or boy. It is at this stage that the tonsils and adenoids should be dealt with, and not left until a later period.

We mention all these diseases and their consequences; but have we any knowledge of how to avoid them and to do away with them? So far, diphtheria is really the only one with which we can cope. There is a method of immunization against diphtheria, and it should be applied to all children. Unfortunately, in this country, though a good deal of publicity was given to it last year and a great number of children were immunized, the general public has not sufficient knowledge, nor is immunization compulsory, as it is from time to time against smallpox. In consequence, we still have a great deal too much diphtheria. In countries in which general immunization is adopted diphtheria has been almost wiped out, and there is no reason why this should not happen here.

In other troubles, such as whooping cough, measles, rheumatism and scarlet fever, immunization work is being carried out. I think we can be quite sure that in a few years we shall have safe methods of protecting children against them all, and that the menace of all these infectious fevers of childhood will be removed. Once this has been done a great many of the causes of death and invalidity in children will be eliminated.

It may be seen, then, that these years of life, between two and seven, are rather crucial ones from the medical point of view. Not only do we have these infectious fevers, infected tonsils and adenoids, with their consequent effects upon the stature and growth of the child, but we have also the aftermath of any bad feeling in the first two years of life. It is during these years that growth is so pronounced that it is essential that the nutrition and health shall be well looked to if we hope to have the child developing into the strong, healthy individual we would all like our own child to be.

Behaviour.

Until late years parents have known little of the feeding and care of the baby—a fault that is rapidly being remedied by means of infant welfare centres. But the knowledge of the care of the child has not progressed beyond the welfare centre age and certainly not so far as the upbringing of the child is concerned on the mental or behaviour side.

The period of babyhood is mainly one of automatism—the babies suck, they sleep, and it is not for some time that they begin to acquire their muscular coordination, in that they can hold up their heads without wobbling, sit up, and later walk; finally, their finer coordination comes into play, when they can handle toys without dropping them, and when the muscles of the larynx are so controlled that they talk. In the early months they do begin to notice, they see bright things and toys and play a little with them. It is not, however, until they are really walking and talking a little that their intelligence advances enough for them to connect things together; of course, at that period their reasoning power is still small, and comes into action only as a result of repeated experiences. It is often after they have learned to walk and after they have seen and handled fresh things that they begin their mental development.

The spirit of inquiry is shown by the ceaseless questions, the answers to which are quickly forgotten, and from which knowledge is acquired only through frequent repetitions. In the normal child we can expect an even, slow development, gradually advancing from step to step.

The rapidity with which the mental processes develop is astounding, and the extent to which they can go distinguishes humans from all other animals.

It is the great rate of development in the first five years of life that necessitates most careful training on the behaviour side, so that the child may adapt his individuality to community life. This lack of proper training it is that leads to the selfishness and non-recognition of the rights of others that are among the present-day evils in our large communities.

The persons with whom the child comes into most frequent contact at this period are either the mother or the nursemaid. The mother, with her hands full of other duties as well as the care of the child, is apt to give in to the child and to be over-indulgent to it on the one hand, and on the other to be irritated by trifles that she would not notice in other circumstances. But she does give it the mother love that can be supplied by no one else.

At present, trained nursemaids for this period are not available. The nursemaid can look on her work in a more impersonal manner, but for that reason is likely to let her own interests override those of the child.

The first troubles in management arise from failure of the child to understand what is required of it. There is eternal questioning and the child does the first thing that has come into its head because it has no knowledge of whether the act

is right or wrong. The parent or nurse is impatient and is incessantly saying "Don't do this" and "Don't do that", and threatening the child with punishment, forgetting that it does not remember what it is told only once, but that a great deal of repetition is necessary before a fact seeps into its consciousness. The result is that the child, repressed in his initiative, becomes bored, fretful and resentful, and more and more seeds of opposition to control are sown—the child does not yet understand why everything is wrong, and resents the continual restraint.

The wise nurse is the one who will try to develop in herself a spirit of patience and, as far as possible, to side-track the fight when it is looming.

It must be recognized that there is a distinct lack of knowledge of the care of the child at this age. First of all, those people who should advise—medical men, educationists and others—are only on the fringe of knowledge; the subject does not come up acutely to them, no well-defined scheme based on a sound knowledge has been put forward for the care of the child at this age. Is it any wonder, then, that both the mother and the nurse, with nothing to guide them, except perhaps past experience, are at a loss?

Changes, however, in the training of the child have taken place in the last fifty years, and particularly since the Victorian era, when it was considered that the child should not speak unless addressed by its parents, and should be severely punished for all opposition to authority, when boys were thrashed unsparingly and girls were locked up in their rooms as punishment—the days so well portrayed in "The Barretts of Wimpole Street". The change to better times has been slowly coming, but has not yet fully arrived. The parent is still too much the autocrat, and it must be acknowledged that the upbringing of young children still leaves much to be desired.

A swing over to the other extreme, however, has been noticed for some years past, and instead of undue severity, there has been with some parents, and still is, a granting of too much liberty; and the dictum that the child should be allowed to show its own "self-expression" covers the gross spoiling of many children that is undoubtedly going on at present. In such instances parents have jumped too quickly from one stage to the other, and it is only by training and the use of knowledge scientifically worked out that we shall be able to strike the happy medium.

It is very difficult to detect or to understand the exact reason why things go wrong; but it is above all else the behaviour of the mother or nursemaid that determines the reaction of the child. It is for them to realize that the whole future outlook of the child at this and at a later age will be determined by the attitude of those in control, and that an ill-behaved or difficult child is in most cases a reflection on the mother's mentality and health and knowledge of her job.

The difficult or problem child is generally the result of defective management; and he is one who, either by his own distorted ego or a similar condition in the parents, or by a combination of both (for here too heredity plays a large part), is unable to slip into his place in the ordinary running of life without undue friction. He is always in trouble, always doing the wrong thing, a trial to his parents, in fact a general nuisance to all who may be in the household. The bad behaviour may be practically continuous or may occur at intervals in outbursts.

It may be seen at a very early age, and usually the first appearance of trouble in a child is noticed in connexion with its food. This is only natural, as food forms the great outside element in the first few months of life; but once trouble occurs it goes on from bad to worse.

Usually the first fault is with the mother; she is so anxious that her baby should keep well and have what she thinks is enough food, that she forces on it quantities, even of breast milk, and it is astonishing and almost unbelievable how early the opposition complex develops. I have seen breast-fed babies of three or four months of age who would successfully refuse all food, and could be induced to swallow it, almost automatically, only after being drugged into stupidity.

This very early habit of saying "No" (and we all know that it is one of the earliest accomplishments of the child) more commonly comes on at a later age, but if established early the habit is exaggerated. The mother tries everything in her knowledge—implores, threatens, weeps, punishes—at every meal, but it is all with no result; the child will not eat what the parents consider sufficient. Generally, however, if left amongst strangers, it will be a little angel in this respect until it has learned how much rope it can give the newcomers; and when it has sized them up, and if they are proved sufficiently wanting, repetition occurs and the round begins again.

It is but a stage from this to the older child who refuses to obey on principle, who goes into tantrums and unquenchable fits of crying, becomes mischievous and is always in trouble. It arises from the inability of the average parent to understand that the child, even the baby, has a mind, a personality, of its own, and that it is unable, not having the experience, to know what is right and wrong; and so the child's life is more or less a constant contest against authority, against people who will not allow him to do as he wishes, and he does not understand why.

The parent or nurse should be tolerant and try to guide the child by example or explanation, not by methods of force. Children are too often told "to do as they are told and not answer back", and their general views are suppressed for so many years that it is hardly to be wondered at that, thus brought up, they become permanent rebels against authority.

It is really that such a child craves attention and recognition; he thinks that he should be the centre of the picture. This is partly due to the mother, who loves to elicit and show off the child's accomplishments, and partly to the egotism of youth, which cannot realize that there is anyone else in the world whose interests should override its own.

Often the persistence with which a forbidden thing is done again and again is but an effort of a child to bring himself prominently into the picture again during the period in which he has to learn that he is not the only pebble on the beach; this is the most difficult thing for him to understand while he has a mother and a nurse who devote their whole attention to him.

In the early days (and when successful this attitude is carried on for years) are manifest the determination not to be left alone to go to sleep and the refusal of food. In these two things, if it comes to a fight, the child must win. Nobody can make him sleep, and he can refuse food, can hold it in his mouth for as long as he likes, and, finally, nobody can prevent him from spitting it out again. It is here that he first learns his power and discovers how far he can go.

A great deal is being written nowadays on teaching the child, and, like the food faddists, each writer contradicts the other. How, then, can we be surprised if the poor mother, knocked from pillar to post, becomes more and more confused and finally loses heart altogether as her efforts become, as they must under such uninformed advice, unsuccessful.

It is really pitiful to think of the amount of stupid advice the poor young mother receives from female friends and well-wishers, but, above all, from the maiden sisters and grandmothers, who, seeing the child only occasionally and having no responsibilities, spoil and pamper him to their hearts' content.

It is unfortunate that under the present health organization there is no accredited body to advise the mother. Medical men, with but few exceptions, are not interested in the subject. There are no nursery schools at the present time that, in the complete sense of the word, coordinate all the interest of the pre-school child, and to which the mother can go for advice and counsel.

Child guidance clinics are being introduced into this State of late years, but not yet in sufficient numbers. They, when well organized, are capable of giving much information on these problems of the management of the difficult child. These are clinics where the question of the child's failures is studied, where the parental and home conditions are inquired into, as well as the child's general health and the part he plays in the problem. Advice is given, general conditions are looked to, and the parents are helped. Such a clinic usually consists of: a psychiatrist, that is, a medical man specializing in troubles of mentality; a psychologist, who can assess the child's intelligence; and a social worker, to see to the home surroundings, to keep

in touch with the child, to help the parents when they lose heart, or are unable to carry out the recommendations, and to smooth out the difficulties. And if a solution cannot always be found, at least advice can be given on methods of training which are likely to ameliorate the child's condition by consideration of the errors of both the parents and the children.

Baby Health Centres.

Excellent care of babies and means of advice to parents are provided by the various baby health centres that exist everywhere in Australia.

It was due to Sir Truby King, of New Zealand, that they first came into existence, and his views and plans have been accepted throughout Great Britain, New Zealand, and Australia. In New Zealand these centres were first established in 1907; in New South Wales in 1914. They are mainly in poor areas, but are available to everyone in the community, and much use has been made of them by all classes. They are places to which mothers may take their infants up to two years of age to have them weighed, and for advice on feeding—whether the infants are getting sufficient food if they are on the breast, and what food the infants should receive at the time of weaning and during the second year of life. These clinics are under the charge of a nurse with a general training who has also had special training in the feeding of babies.

This special training has been given at a training school or hospital whose main objects are: (i) Care of babies within its walls. (ii) Training of the mothers of these babies in infant feeding, and particularly in the methods of retaining the breast-milk if the supply is failing. (iii) Training of qualified nurses to take charge of baby clinics or welfare centres, of obstetric nurses for infant welfare work in lying-in hospitals. (iv) Training of nursemaids in the care, management and feeding of babies.

There are in New South Wales 51 baby health centres and three training schools, and last year there were 760,000 attendances at these institutions. I think they can be said to have proved their value; and even more than that, they represent the greatest advance in the concerted care of young children that has yet been evolved.

Mothers have been taught how to preserve their breast-milk (naturally the best food); they have also been shown how to manage their babies and how to care for their health; they have been shown how to feed them after weaning, or how to feed them on artificial food throughout, if it has been necessary.

It is stated that the institution of baby health centres has been responsible for the great drop that has taken place in the mortality of children from summer diarrhoea during the first year of life. This is shown in the accompanying table.

In New Zealand, the death rate is even less, in fact, the lowest in the world, and it is stated that summer diarrhoea has been abolished. Whether this is all due to baby clinics is open to argument; but there can be no doubt of their value. The greatest

criticism that can be launched at the system is that it stops abruptly at two years, and there is no similar body to carry on supervision until school age.

Table showing the Death Rate of Children from Summer Diarrhoea.

Under One Year.		In First Two Years of Life.	
Year.	Rate per Thousand.	Year.	Rate per Thousand.
1885	150	1896	41.4
1895	110	1906	24.3
1905	80	1916	20.6
1915	68	1926	15.1
1925	54	1936	3.2
1935	49	1937	2.9

Nutrition.

It is, perhaps, superfluous to lay stress on the importance of adequate nutrition in the growth of the child. The bony growth of the skeleton from which the muscles get their purchase, the muscular development, the posture and poise of the body, whereby the organs are held in their most efficient positions, are all dependent on a good state of nutrition.

In the round-shouldered child, the lower part of whose chest is depressed in front, the lungs and heart are compressed and constrained to do their work under difficulties. The abdominal organs, such as the liver and the stomach, are more or less displaced and work at a disadvantage. Such attitudes must be considered as symptomatic of past malnutrition. So, too, a healthy brain and good mentality are just as much dependent on proper food as is a healthy body.

There are many tests for recognizing the standard of nutrition and they are given in detail in an excellent report issued by Dr. Clements of his investigation on "The Relationship of Food Intake and Malnutrition in Sydney". Dr. Clements in this report shows that among all the children examined, there was a percentage of 23 who showed unsatisfactory nutrition. In babies from birth to two years the percentage was 25; from three to five years the percentage was 18; from six to eight years it was 29; and from nine to twelve years, 33.

Actually, it is lowest in the three to five year group, but many of the children examined were at free kindergartens, and Dr. Clements considers that this was probably responsible for the better nutrition of this group. The striking fact was elicited that, of 576 children attending kindergarten, 87 or 15% showed unsatisfactory nutrition, while of 175 not so attending, 58 or 33% were not satisfactory.

I would recommend this report and also the final report of the Advisory Council on Nutrition, recently issued, to all interested in this aspect of life. They are most valuable contributions to the study of nutrition.

We do know a great deal about diet and food values, but we have yet a great deal to learn. That this is so is evidenced by the various theories and fads that exist as to what constitutes a proper diet.

But we must remember that no two people, even children, are quite alike in their tastes. The old statement that one man's meat is another man's poison is very true; people are built on different lines and need different amounts and types of food. For instance, the large, heavy person is generally a more scanty eater than his lean brother, although the gourmand in certain types has to pay the penalty for his indiscretion. The grossly over-fat person, a victim of some defect of pituitary secretion, can be starved to the point of exhaustion without any great reduction of weight, owing to an inability to mobilize the fat into the general circulation where it can be utilized.

We cannot afford to become too standardized in our dietary, nor should we have too much repetition. We should not think that any one diet is the right and only diet, but must introduce variety in such a way that on the whole the diet contains those bodies necessary to growth and variations of health as well as the daily fuel which we use in muscular and mental work.

Luckily our choice is large, and so variety can be found. We know that there are likes and dislikes of food and that some people are unable to digest certain foods. Again we know that, when digested, food may react in various ways to upset the person's constitution and bodily comfort. We see this quite commonly in children who react to certain foods by having an attack of urticaria, or hives as it is called.

It is not difficult to lay down a general optimum diet; but whether it can be attained in full in these days of crowded cities, transport of food over long distances and varied distribution of money amongst the population, is quite another matter.

We, in cities, do not get our food as fresh as it might be. Our fruit and vegetables are brought to us from long distances—there are long periods between picking and consumption, taken up by carriage and marketing. Our meat must necessarily be kept in cool storage, our milk must be pasteurized; and there is no doubt that all these processes both interfere with the quality of the food and also add considerably to the cost.

Among the poor, this cost has its reaction in the quantities and quality of the food that they can buy, and is a strong factor in the malnutrition of city children.

Bad cooking, too, plays a part when it renders the food unappetizing; but the main problem in malnutrition is want of knowledge and want of care on the part of the parents, as, for instance, when the child eats too often and too much of unsuitable foods, sweets *et cetera*, to the exclusion of some of the necessities. Malnutrition is not only a matter of thinness or emaciation from starvation of quantity; the grossly over-fed child, often the winner of the best baby contest, may be equally classed as ill-nourished. Here, the malnutrition is the result of ill-balanced ratios of the necessary factors.

What are our requirements of food at this age? A supply of proteins or flesh is needed, of carbo-

hydrates found in sugars and farinaceous foods, and of fats. In addition, there are various metallic salts and the bodies that are called vitamins.

There is neither the time nor the need at the moment to go into the various sources and values of the proteins, carbohydrates and fats, but a word might be said about the mineral bodies that are necessary for our well-being. These comprise iron, manganese and copper for the blood and for the interchange of oxygen and carbon dioxide in our lungs, by which we breathe; calcium or lime, together with phosphorus, not only for the growth of bone, but for numerous other purposes in our economy; iodine, for the general thyroid metabolism; and sodium, potassium, magnesium and many others that have their uses more or less. It is from our food that we normally receive them and so we must take them into account.

But investigation is needed into the part played in nutrition by some of the rarer metals. For instance, a close examination of the mineral constitution of the yolk of fowls' eggs, made some years ago by the Cancer Research Committee in Sydney, revealed to the surprise of everyone the presence of unexpected metals such as lead, uranium and molybdenum. Their presence may have been merely coincidence, but it was constant, and Nature is not apt to be wasteful. Again, in research by the Council for Scientific and Industrial Research a disease in sheep characterized by a severe and fatal anaemia called "Coastal Disease" was found to be due to a cobalt deficiency in the soil, and the administration of cobalt in small doses was necessary to control it. It was further found that cobalt alone would not effect a complete cure, but that small additions of nickel, copper and manganese were necessary. The Council for Scientific and Industrial Research found that the lack of manganese in the soil would hinder the growth of oats; and here, too, can be seen the indirect effect such deficiency would have on the blood of human beings who eat such farinaceous food as oats derived from such a source.

We must, too, be careful and investigate the mineral content of food in Australia. For the past century or more we have been living on the surface of the land, taking all from it and putting nothing or but little back. We have been depleting it of mineral salts, iron, copper, calcium, phosphorus *et cetera*, and it is not to be wondered at if our meat and vegetables should prove to be deficient in the necessary minerals. Sheep and cattle are affected by this and may show signs of gross deficiency of calcium and phosphorus. Before we can say that we are getting the standard necessities in our food, it will be necessary to show that our food here in Australia contains the necessary quantities at all times.

It must be remembered that the metals are not always contained in the food just as plain straightforward salts of a metal, like sodium chloride, but are often in combination with some other organic parts of the food, which renders their absorption

easy and natural, whereas in some cases it may be very difficult to find a plain salt that can be freely absorbed.

Much research has been done and some knowledge acquired in the action of the accessory food factors, now called "vitamins". We are still, however, far from a full knowledge of their various reactions within the body, especially of their reaction on what are called the endocrine glands, the glands in our body that govern our whole economy. The endocrine glands manufacture certain activating bodies that put into action or suppress the over-action of all the working parts of the body that control the heart, blood pressure, growth, digestion, mentality *et cetera* and practically everything in our lives. Work is being done, but finality is far from reached on the relations and reactions of the vitamins found in the food and the glands that govern our lives; the question is a very complex one, for both vitamins and glands are, individually or combined, activators of the whole working of the life processes.

These vitamins have been known for some time, and a great deal of research has been done in regard to them, but there is a great deal more to do. We do know the effect in the way of disease of a complete lack of some of the vitamins. Thus, beri-beri and other diseases are due to a complete lack of some of the vitamins of the *B* group. Again, with vitamin *A* a lack may lead to changes in the eyes whereby acute perceptions of light are attained. Rickets is a production of deficiency of vitamins *A* and *D*, and scurvy, so well known in the old days on ships and also found occasionally in babies, is due to lack of vitamin *C*.

But a great deal of research work is still necessary into the effects of deficiencies of these in food, rather than their complete lack. We do know that Nature is all-provident, and in some cases of deficiencies of vitamin *A* she can rectify the deficiency within the body by manufacturing vitamin *A* from other existing bodies, such as carotene. We also have the power of manufacturing vitamin *D* by exposure of the skin to sunlight; but how far Nature can go and the exact effects on our well-being of small deficiencies still need to be investigated.

Another question requiring investigation is the storage of these vitamins in the body if excess is taken, or what harm excessive dosage may do, and how far Nature can eliminate any excessive quantity without gross harm.

There is no doubt that we are erring at the moment in giving, as medicines, to help the actual or supposed lack of vitamins in food, gross doses of vitamins, such as vitamins *A* and *D*, which the manufacturing chemists have poured out in quantities, which medical men are advising, and which the public is buying indiscriminately.

It is true that Nature can probably deal successfully with these over-doses, but we are not yet aware how far we can go.

Discoveries are being made almost daily as to the functions of the endocrine glands. They are responsible for all the work of the body, and all growth and all change. For instance, the pituitary gland, the gland that is said to preside over all others and to control and help or suppress their activity, is known to put other glands into action by its secretions, and so indirectly as well as directly it controls our growth, sugar production, circulation *et cetera*. In the young we may see gross changes due to its dysfunction. It is the excessive secretion of this gland, in the main, which produces giants, and in adults, when a tumour of this gland causes an over-secretion of its product, we get a form of gigantism called acromegaly. Again, from a certain form of deficiency we get dwarfs; again, with another form of deficient nutrition, we get an excess of adipose tissue. This is a condition quite common in this country. We see them every day—the over-fat children, of the type of the fat boy in Pickwick.

Then again, the thyroid gland is responsible in a large measure for the proper growth of the body, and, too, for the proper intelligence.

Iodine is necessary in our food to activate the thyroid, and sometimes when there is defect of iodine in the soil and consequently a defect in our food we find, from lack of activation of the thyroid, cases of cretinism and idiocy, stunting of growth and development.

The parathyroid gland, together with vitamin *D*, is responsible for the proper depositions of lime in the bones, and we know that with an overaction of these glands the lime is absorbed and the bones are weakened until they bend or break.

All these glands, in fact, have their own specific action on the body, growth and change. There are internal secretions given out by the liver, the pancreas, and other glands without which life would not function properly.

This raises another question in diet, again not fully understood, as to whether it is right that these glands should be used in our daily diet, and how far cooking and storage deprives them of any good qualities they may possess before they are taken as food. As we know, liver is often prescribed in certain types of anemia on account of its ability to provide the iron in a form which can be used in the blood. An interesting point in support of these organs as part of the dietary was given by the discovery that in the Amsterdam Zoo the carnivora always kept healthy and sleek-coated and were able to reproduce their kind, whereas in other zoos they were not so healthy and were never able to breed. It was found that in Amsterdam the animals were fed on the bodies of small animals which they ate *holus-bolus*, as compared with the huge lumps of meat—limbs of dead horses *et cetera*—eaten in other zoos. It was thought that the absorption of the endocrine products from the various organs was responsible for the greater health of the Amsterdam animals and their ability to reproduce their kind.

SOME ASPECTS OF OPERATIONS FOR INTERNAL DERANGEMENTS OF THE KNEE JOINT.¹

By E. F. WEST,
Adelaide.

I HAVE divided my remarks into two sections: (i) general considerations of operations for internal derangements of the knee joint, and (ii) special considerations of the commoner operative procedures.

General Considerations.

I have subdivided my general considerations into four groups, under four headings: (a) exact pre-operative diagnosis, (b) asepsis, (c) avoidance of unnecessary trauma, and (d) efficient after-treatment.

Exact Preoperative Diagnosis.

It is essential before any knee joint is opened, that as exact a diagnosis of the nature of the lesion as is possible, with all means at our disposal, should be made. I cannot too strongly emphasize this. The principle of operation for exploration of the knee joint is bad. This dictum is stressed by McMurray, of Liverpool.

Adherence to this ideal will result in limited exposure and interference, and will tend towards exactitude of technique.

Asepsis.

There should, of course, be no need to labour the point of asepsis. Rigid asepsis, however, in the case of arthrotomy, involves more than a thirty-six-hour skin preparation and the efficient cleansing and gloving of the surgeon's hands. Non-touch technique should be practised; and this brings into its scope the operator's assistant and the instrument sister, the corollary being that these, as well as the surgeon, should be properly trained.

Avoidance of Unnecessary Trauma.

Avoidance of unnecessary trauma is a point of prime importance in these operations. Long incisions through the synovial membrane should be avoided; they are apt to be followed by recurrent synovitis, which leads to quadriceps weakness and a weak and troublesome joint. The same applies also to trauma to the infrapatellar fat pad. With the preoperative diagnosis properly made, the lesion is dealt with through the smallest and best placed incision, with the minimum of division of important structures commensurate with satisfactory removal or repair.

This brings me to the question of the tourniquet. All operations on the knee joint should be done with hæmostasis efficiently controlled by a tourniquet placed around the middle part of the thigh. Before the tourniquet is tightened the limb should be emptied of blood, either by elevation or by the

use of a rubber bandage. It is my experience that very few assistants or nurses are able to apply an efficient tourniquet, and therefore I always do it myself. This is necessary unless one is working in a team with thoroughly trained assistants.

Most of us accept these points as elementary, but it appears that this is not universal. I recently read an article describing a method of arthrotomy for internal derangement of the knee joint, which the author wished to be placed on record as a standard method. No tourniquet was used, a drain was always placed through the synovia into the joint, and a long patellar-displacing incision for removal of the external cartilage was used; so that we may judge that "standard" methods vary.

After-Treatment.

Lastly, but not least important, is the question of efficient after-treatment. This may make or mar the result or unnecessarily prolong convalescence. The period of convalescence after operations for internal derangements of the knee joint should depend upon the pre-operative condition of the joint—that is, upon the length of time that the lesion has existed and upon the efficiency of the conservative treatment, with the consequent amount of quadriceps wasting, joint effusion and ligamentous laxity. Too often, however, details such as quadriceps development, prevention of scar stretching *et cetera* are neglected; the results are undue prolongation of convalescence and impairment of ultimate function.

Special Considerations in the Common Operative Procedures.

Removal of a Semilunar Cartilage.

Internal Meniscus.—Lesions of the internal meniscus are the commonest conditions requiring operative treatment. Nothing short of complete removal of the cartilage should ever be performed, and this is done through an oblique anterior incision, 3.75 centimetres (one and a half inches) in length. The incision through the synovia measures 2.5 centimetres (one inch). I find a small head lamp a valuable aid; but this is not necessary if the theatre is efficiently lighted. The leg hangs over the end of the table, with a sandbag under the popliteal fossa, and the foot is grasped between the surgeon's knees so that rotation may be controlled. The incision runs from above, at the lower edge of the patellar condyle, downwards and outwards to the edge of the tibial condyle. The question of using a curved incision running in the opposite direction to avoid cutting the patellar branch of the saphenous nerve I consider to be in the nature of what our American friends would call "hokey".

A hook is inserted under the anterior attachment of the cartilage and this attachment is divided, care being taken not to injure the fat pad unnecessarily. The end of the cartilage is grasped with an efficient clamp and then its attachment to the lateral ligament is divided with a sharp narrow-bladed knife. This is usually the most difficult and delicate part

¹Read at the annual meeting of the Australian Orthopaedic Association (British Medical Association) in March, 1938.

of the operation, and considerable care and practice are demanded so that the surgeon does not leave a peripheral rim of cartilage behind on the one hand, or on the other, damage the ligament or articular cartilage of the tibia. When the firm lateral attachment is divided, the weak coronary ligament behind easily gives way under traction and the posterior attachment is left. This may present a little difficulty, and some care is necessary so that no tag is left which later may become elongated and, by getting between the condyles, cause further symptoms. It is best dealt with, I think, by the use of a Jones tenotome under vision.

In the closing of the joint the synovia is stitched with number 1 plain catgut, a Riverdin's needle being used. A continuous stitch is employed, and this returns to close the false capsule, or aponeurosis, as the second layer. Three interrupted silkworm gut stitches close subcutaneous fascia and skin.

A gauze pad is placed over the closed wound, and then some cotton-wool; these are fixed with a firm bandage, and over the top a second layer of wool and a slightly tighter bandage are applied. The tourniquet is now removed and a gutter splint is applied to the leg.

The patient remains in bed with the leg elevated on a pillow for ten days, when the dressings are taken off and the sutures removed. The back splint is replaced and the patient is allowed up to walk in the splint for a further ten days. It is then removed and some "Elastoplast" is put around the knee up to the level of the upper border of the patella. This is worn for two weeks, by which time usually the quadriceps has recovered and the knee function is satisfactory. If the muscular development is satisfactory the patient can indulge in sport six weeks after the date of the operation.

Occasionally operation is required for removal of the posterior end of an internal meniscus which has been left after incomplete removal, or sometimes after a complete transverse tear.

The leg is arranged on the table, lying on its outer side, and flexed to nearly 90°. A small incision is made posterior to the internal lateral ligament parallel to and just in front of the hamstring and sartorius tendons, which in this position have retracted to a position just behind the posterior edge of the tibial condyle. When the capsule is opened the surgeon comes right onto the posterior portion of the meniscus, and its removal is easy.

External Meniscus.—Abnormal conditions requiring operation include the following: (a) tears and displacements, (b) a congenital discoid cartilage, and (c) cyst formation.

In all of these complete removal of the cartilage is necessary. The operation is performed in exactly the same manner as when the internal meniscus is being dealt with, but is modified by some anatomical differences. First, there is less space in the outer compartment of the knee joint; the cartilage is smaller, forms a larger segment of a smaller circle than the internal meniscus, and its anterior and

posterior attachments are closer together. These elements are compensated for by the fact that the lateral attachment of the cartilage is loose and is not attached to the external lateral ligament.

After removal of a cartilage for cyst formation, if the cyst is large a hole appears to be left in the loose fatty areolar tissue on the outer side of the joint, into which the cyst has burrowed and made a nest for itself. With a little care, however, the synovial membrane can usually be satisfactorily closed; but one should bear this in mind when removing these cystic cartilages, and not remove more synovial membrane than is absolutely necessary.

The posterior end of the external meniscus can be approached, if necessary, by an external posterior incision. This is a small incision anterior to the biceps tendon. The capsule is opened between this and the external lateral ligament and the ilio-tibial band, the knee being flexed and lying on its inner side. Care must be taken to avoid the popliteus tendon.

Removal of Loose Bodies.

Loose bodies in the knee joint are of variable size, shape and consistency, and have various origins. They may be single, multiple, free or attached, and their nature should be determined by an exact preoperative diagnosis.

Freely movable loose bodies are best dealt with by the method of McMurray. An incision 3.75 centimetres (one and a half inches) in length is made over the outer aspect of the suprapatellar pouch, the knee being extended. The left hand, protected by a sterile towel, then grasps the knee behind and on either side, and the *Gelenkmaus* is milked up and made to present at the incision, where it is grasped and removed. Bodies in the posterior compartments, which are too large to come forward, are approached by the internal or external posterior incision which I described in dealing with the posterior end of the menisci.

Attached bodies are, of course, approached by a small, appropriately placed incision. A common attached body is that due to *osteocondritis dissecans*. This is usually situated on the outer side of the internal femoral condyle, and consists of a piece of the articular cartilage separated off by this process and turned down as a hinge. This is dealt with by an incision similar to that for removal of the internal meniscus.

Conclusion.

It will thus be seen that the incisions used in the common conditions demanding operation for internal derangements of the knee are five in number; they are all small incisions, approximately 3.75 centimetres (one and a half inches) in length. Three are anterior—that is, internal oblique, external oblique and suprapatellar. Two are posterior—external posterior and internal posterior.

Only an anterior incision is necessary for complete removal of a meniscus. Combined anterior and

posterior or a long curved lateral incision is not necessary. The long patellar-displacing incision should be avoided; it is likely to be followed by recurrent synovitis and a dislocating patella.

Finally, once again may I reiterate the necessity for an exact preoperative diagnosis before arthrotomy for internal derangements of the knee is undertaken.

"PENTOTHAL SODIUM" ANÆSTHESIA: A REVIEW,
WITH AN ANALYSIS OF 333 CASES.

By S. V. MARSHALL, M.B., Ch.M. (Sydney),
D.A. (R.C.P. and S., England),

Honorary Anaesthetist, Royal Hospital for Women;
Honorary Assistant Anaesthetist, Sydney Hospital
and Department of Neurosurgery, Royal Prince
Alfred Hospital; Honorary Assistant Instructor
in Practical Anaesthetics, Saint Vincent's Hos-
pital; Honorary Consultant Anaesthetist,
Dental Hospital and Balmain District
Hospital, Sydney.

THE many advantages of the administration of anaesthetics by the intravenous route, although for long well recognized, have been until recently outweighed by the disadvantages. Ever since chloral hydrate was so used in 1872,⁽¹⁾⁽²⁾⁽³⁾⁽²⁶⁾ a wide variety of agents has been given trial, but results were generally disappointing and sometimes disastrous. Among the more promising were "Hedonal" (methylpropylcarbinol urethane), "Isopral" (trichlorisopropyl alcohol) and ethyl ether;⁽⁴⁾ but these, like many others, were discarded because of the amount of trouble involved in their administration and the frequency of undesirable after-effects. Consequently the method fell into disrepute; but valuable pioneering work had nevertheless been done. This resulted in improved conceptions of the requirements of the situation, and led to rapid progress when better agents became available.

Certain drugs of the barbituric acid group have met this need. The original preparations of this series (barbitone *et cetera*) were quite unsuitable for intravenous use because of their prolonged action. Later examples, such as "Amytal Sodium" (sodium isoamylethyl barbiturate) and "Nembutal" (sodium ethyl (1-methylbutyl) barbiturate) may be given intravenously with great advantage in convulsive and maniacal states,⁽⁵⁾ and possibly for producing basal narcosis; but their action is still too sustained to warrant their use in this way as anaesthetics. The introduction of the short-acting barbiturate "Evipan Sodium" (sodium N-methyl cyclohexenylmethyl barbiturate) was a revolutionary development, necessitating much revision of current beliefs regarding the dangers of intravenous therapy. Even today arguments, based on its irrecoverability after injection, are opposed to its use, the fact of its rapid destruction in the body being ignored. Admittedly, "Evipan Sodium" has its limitations; but used wisely and with reasonable care, it is a boon to doctor and patient alike.

Unfortunately, however, it is sometimes of inadequate potency; muscular relaxation may be imperfect and there is rather frequently much restlessness during recovery from its effects, especially if a supplementary anaesthetic, such as ether, has been used. In addition, tremors and jactitations commonly occur during induction of anaesthesia with this agent, although their incidence is reduced if the solution prepared for injection is allowed to stand for about fifteen minutes before use.

"Pentothal Sodium" has many peculiar advantages. First used by Lundy in 1934,⁽⁵⁾⁽⁶⁾⁽⁷⁾ it has been found so satisfactory that up to the end of 1937 administrations totalling 7,961 were reported from the Mayo Clinic alone.⁽⁸⁾ Introduced into England by Jarman and Abel,⁽⁹⁾⁽¹⁰⁾ it has since come into extensive use. Reports are uniformly favourable from England,⁽¹¹⁾⁽¹²⁾⁽¹³⁾ as they are also from Canada⁽¹⁴⁾⁽¹⁵⁾⁽¹⁶⁾ and South Africa.⁽¹⁷⁾⁽¹⁸⁾ The numerous American clinical reports are similarly enthusiastic. Hitherto only brief references have appeared in the Australian medical literature.⁽¹⁹⁾⁽²⁰⁾⁽⁵⁸⁾

Like "Nembutal", "Pentothal Sodium" has greater potency, weight for weight, than comparable agents, so that dosages may be substantially reduced in the procuring of given effects.⁽⁷⁾⁽¹⁶⁾⁽¹⁷⁾ Elimination is thus facilitated, and in the absence of overdosage recovery of consciousness is accelerated.⁽²¹⁾ Further, the increased potency makes it possible to attain deep anaesthesia and full muscular relaxation with safe dosages. The induction of anaesthesia with "Pentothal Sodium" is remarkably quiet and smooth, and recovery from its effects occurs with only very occasional restlessness, even if supplementary agents have been used. Vomiting is rare, and if it does occur is usually attributable to some cause other than the anaesthetic, the preliminary or subsequent use of morphine very often being responsible.⁽²²⁾ Despite their common association with the barbiturates (usually in poisonous doses), pulmonary complications after this form of anaesthesia are extremely rare.

The patient's impressions of the anaesthesia are entirely pleasant, especially in comparison with those of any previous administration of ether or even of nitrous oxide. No sensation of smothering, vertigo or tinnitus accompanies induction, and recovery of consciousness is compared with the awakening from a deep and refreshing sleep. The equanimity with which repeated anaesthesia with this agent is faced, even by otherwise violently non-cooperative adolescents, is one of its most striking recommendations. It is a merciful alternative for those intolerant of other forms of anaesthesia, especially since its range of applicability is comparatively wide.

Chemistry and Physical Properties.

"Pentothal Sodium", like "Evipan Sodium", differs from the usual products of the synthesis of barbituric acid derivatives in that substitutions have been made on the urea side of the

nucleus.^{(8) (14) (23)} It is very closely related to "Nembutal", the sole difference being in the replacement of one of the oxygen atoms of the molecule with a sulphur atom. The following structural formulae illustrate this relationship and modification:

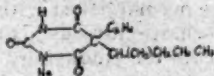


FIGURE I.

Sodium ethyl (1-methylbutyl) barbiturate ("Nembutal").

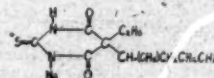


FIGURE II.

Sodium ethyl (1-methylbutyl) thiobarbiturate ("Pentothal Sodium"). The asterisk indicates the modification effected. Evidently the result is greatly to reduce the stability of the molecule, so that it is much more rapidly destroyed in the body.

"Pentothal Sodium" is supplied as a faintly yellow powder, sealed in glass ampoules containing either 0.5 or 1.0 gramme. In general the smaller size will be found adequate for ordinary purposes, the larger being useful when more prolonged anaesthesia (lasting from twenty-five to forty-five minutes) is contemplated. It is accompanied by ampoules of chemically pure sterile water, containing either 10 or 20 cubic centimetres, for dissolving 0.5 or 1.0 gramme, respectively, to make a 5% solution. Originally 10% solutions were recommended; but experience has shown that less irritation will be caused by any perivenous leakage if the weaker solution is used. In addition, the small risk of venous thrombosis is reduced, and a better control of dosages is afforded.^{(24) (25)} The 10% solution is also strongly alkaline, its pH being reported to range between 9.5 and 10.6.^{(26) (27)} It is unlikely that this is the reason for the rather powerful depression of respiratory activity often seen with this agent.

The powder dissolves readily, even in cold water; the solution is a faint greenish-yellow colour, effervesces slightly at first, and emits a sulphurous odour. After a few seconds it will become perfectly clear; if it does not, or if an insoluble residue remains, the specimen should be discarded. Injection may be commenced as soon as the solution is prepared, but if necessary may be delayed, since potency is retained for several hours at least.^{(14) (26) (28)}

Pharmacology.

The pharmacological assessment of "Pentothal Sodium" is as yet incomplete, having been rather anticipated by the clinical application, which has justified itself by the results obtained. Various experimental reports are now available, in the main confirmatory of clinical findings. The drug possesses several important peculiarities, which require examination, inasmuch as they concern the different vital functions.

Respiratory Function.

"Pentothal Sodium" is a powerful respiratory depressant. The amplitude rather than the rate of respiration is mainly affected. The gravity of this reaction is lessened by the concurrent reduction of sympathetic activity and oxygen demand; but actual oxygen deprivation from either apnoea or obstruction is not permissible, since cardiac, hepatic and cerebral damage will soon result if relief is not afforded. Overdosage, either from excessive amounts of the agent or too rapid administration, readily produces these effects.⁽²⁷⁾ They are essentially anoxic in origin and are not due to any direct toxic action of the drug.

Laryngospasm, trismus, sneezing, coughing and hiccup sometimes occur, even in deep anaesthesia, either spontaneously or as the result of appropriate stimulation. The first may cause alarming cyanosis and perhaps cardiac embarrassment, being remarkably persistent once established. Such reactions are especially common in the cat and have been shown to originate in parasympathetic hyperactivity.^{(29) (30)} Prophylaxis and control are readily effected by the administration of atropine. There is also a definite increase of laryngeal excitability in this form of anaesthesia.

Circulatory Function.

In spite of its potency, the inherent toxicity of "Pentothal Sodium" is so low as to be negligible when oxygenation is adequate and gross overdosage is avoided. This statement is made with a full knowledge of certain experimental work, on this and other thiobarbiturates,^{(31) (32) (33)} which purports to demonstrate a degree of cardiac toxicity not observed by other workers,^{(34) (35)} and quite at variance with results obtained clinically.^{(36) (37) (38)} Evidently, when given sublethal doses, dogs are extremely susceptible to the development of cardiac arrhythmias. These have been observed even when the blood is fully oxygenated.⁽³³⁾ Obviously it must be possible to build up in the blood concentrations, which would be lethal even in the presence of hyperoxygenation,⁽³⁹⁾ and it is reasonable to expect that the heart would, in such circumstances, give indications of impending failure characterized by these arrhythmias. That immediate ventricular fibrillation does not occur is rather an indication of the wide safety margin still available. Any assertion that on these grounds "Pentothal Sodium" is too dangerous a drug for clinical use and that concurrent oxygen administration is contraindicated⁽³³⁾ is merely fatuous, and need not be taken seriously. Similar phenomena arising in the course of deep cyclopropane anaesthesia are recognized as being purely functional in origin, readily controllable, transient, and of no permanent significance.⁽⁴⁰⁾

Most reports agree that a fall of the blood pressure is characteristic. In some a rise, sometimes following an initial fall, is described, and is probably of anoxic origin. The hypotension parallels the depth of narcosis, and probably is caused by reduced sympathetic activity and not by any toxic effect on

the myocardium. It is usually associated with a compensatory tachycardia, no doubt originating in the carotid sinus. A state of sympathetic hypoactivity is further indicated by the reduced peripheral resistance,⁽⁴¹⁾ the raised skin temperature,⁽⁴²⁾ and the greatly increased splenic volume.⁽⁴³⁾

Hepatic Function.

"Pentothal Sodium" is destroyed in the liver; in this process an adequate glycogen reserve is essential. The degradation products are apparently quite innocuous.⁽²⁾ Suggestions that the drug may be toxic to the liver⁽¹⁷⁾ are not well substantiated; but it probably would be so in the presence of anoxia. The one available report of toxic jaundice following its administration⁽⁴⁴⁾ suggests that anoxemia, aggravated by a rather grave anemia, was a significant factor. Studies of blood sugar levels during "Pentothal Sodium" anaesthesia disclose a very mild hyperglycemia, which is succeeded, during recovery, by a hypoglycemia of lesser comparative magnitude.⁽⁴⁵⁾⁽⁴⁶⁾ Proof that this latter manifestation is evidence of liver damage is quite inconclusive. Here again, sympathetic hypoactivity is probably involved.

Renal Function.

The normal kidney is not affected by "Pentothal Sodium" anaesthesia, nor is any existing functional deficiency aggravated by it.⁽¹⁵⁾ Even advanced renal inefficiency is not a contraindication to its use, since its elimination is not primarily a function of the kidneys.

Range of Usefulness.

"Pentothal Sodium" may be employed for a variety of purposes, chief among which are the following: (i) as a total anaesthetic;⁽²²⁾ (ii) for rapid and pleasant induction preliminary to ether or gas anaesthesia; (iii) as a basal narcotic, especially in gas anaesthesia; (iv) as a supplement to local or spinal analgesia, especially if this is imperfect;⁽¹⁸⁾⁽⁴⁷⁾ (v) in essential hypertension, for estimating the probable value of surgical treatment;⁽⁴²⁾ (vi) as a therapeutic measure, (a) to combat the toxic effects of local anaesthetics, (b) for convulsive states (strychnine poisoning, tetanus, eclampsia, ether convulsions *et cetera*), and (c) for maniacal states and narco-analysis.⁽⁴⁸⁾⁽⁴⁹⁾

"Pentothal Sodium" may be administered orally, rectally or intravenously. The last is the most practicable route, although the others are of use in obstetrics⁽⁵⁰⁾⁽⁵¹⁾ and occasionally for intractable patients and children, when hypnosis or mild narcosis only is desired. Given intravenously, its most striking value is probably its use as a basal narcotic, in view of its rapid action, the minute controllability of dosage, and the absence of prolonged after-effects. Used thus, it greatly facilitates nitrous oxide and oxygen anaesthesia, permitting the attainment of adequate depth without suboxygenation. This practice also permits of much economy when cyclopropane is to be used, since the artificial

airway, cheek packs *et cetera* may be inserted at leisure, and the loss of expensive gas, otherwise incidental to the removal of the face mask for this purpose, may be avoided. Similarly, in nitrous oxide and oxygen anaesthesia the essential preliminary flushing-out of nitrogen from the lungs and blood may be accomplished with oxygen instead of the more expensive nitrous oxide. "Pentothal Sodium" is ideal for inducing unconsciousness before the patient is transferred from his bed to the operating theatre, provided that due attention is paid to the airway during transportation.

Indications.

It is convenient to classify the indications for the use of "Pentothal Sodium" under two headings: (i) general indications and (ii) special indications. The general indications are chiefly referable to the use of "Pentothal Sodium" as a total anaesthetic, and are the following: (a) minor and short superficial procedures generally; (b) the presence of a risk of ignition of inflammable agents; (c) orthopaedic manipulations, for adhesions, reduction of recent fractures and dislocations *et cetera*; (d) relatively minor urological procedures, such as cystoscopy, ureteral catheterization, passage of sounds, lithotripsy, diathermy *et cetera*;⁽⁵²⁾⁽⁵³⁾⁽⁵⁴⁾ (e) relatively minor gynaecological and obstetrical procedures,⁽⁵⁵⁾⁽⁵⁶⁾⁽⁵⁷⁾ such as examinations, curettage, biopsy, implantation of radium, application of forceps, perineorrhaphy *et cetera*; (f) shorter dental and oral procedures;⁽⁵⁸⁾ (g) ophthalmic surgery; (h) myringotomy, antral puncture, antrostomy *et cetera*, a post-nasal pack being essential; (i) minor neuro-surgical procedures, such as thecal puncture and encephalography; (j) as a therapeutic measure, to combat convulsions of whatever origin.

The special indications are chiefly referable to the use of "Pentothal Sodium" as a basal narcotic or adjuvant to other agents, and involve the provision of facilities, such as gas and oxygen apparatus, adequate assistance, and the means for dealing with emergencies. These indications are the following: (a) most major surgical operations, other than those on the upper part of the abdomen;⁽¹⁸⁾⁽²³⁾ (b) thoracic surgery, especially thoracoplasty;⁽³⁾⁽⁷⁾ (c) bronchoscopy and oesophagoscopy, to alleviate the patient's distress (thorough preliminary spraying with cocaine is essential); (d) lung diseases generally, and especially pulmonary tuberculosis, unless gross reduction of vital capacity or obstruction exists; (e) moderate degrees of cardiac decompensation; (f) the need for reduction of the quantity of more potent and more toxic supplementary agents, and consequent lessening of their deleterious effects and hastening of their elimination.

Contraindications.

Contraindications are chiefly referable to the depression of respiratory activity caused by large doses of "Pentothal Sodium" and to the probable state of the glycogen reserve and hepatic function.

There are few absolute contraindications, and these largely depend on the availability or otherwise of facilities for resuscitation, artificial respiration, and especially oxygen administration. The following factors should receive careful consideration.

Children about ten years of age, unless very robust, are not good subjects. Apart from their natural fear and small veins, the inertia of the air in their narrow air passages hinders gaseous exchanges, an undesirable situation in view of their relatively high oxygen requirements. (17) (24) (59)

Gross abnormalities of metabolic activity, such as thyrotoxicosis or myxœdema, may involve excessively rapid or excessively slow elimination.

Very advanced hepatic disease is a contraindication. In general, a liver with sufficient functional capacity to sustain life will deal successfully with ordinary doses.

Starvation from trismus or pyloric obstruction (with low glycogen reserve) is a contraindication.

"Pentothal Sodium" should not be used in uncontrolled *diabetes mellitus*, which means a low glycogen reserve.

In severe toxæmia, pyrexia and cachexia, "Pentothal Sodium" should not be used. In these states cardiac and hepatic function may be gravely impaired, and susceptibility to oxygen-want extreme.

Gross respiratory disease, especially with obstruction, is a contraindication.

"Pentothal Sodium" should not be used for nasal and oral operations, unless the access of blood and saliva to the pharynx and larynx is prevented, since laryngeal irritability is heightened and spasm may develop. (30)

Gross cardiac decompensation, coronary disease, myocardial degeneration and hypotension are contraindications.

"Pentothal Sodium" should not be used in severe anæmia, on account of the impaired oxygen-carrying capacity of the blood.

Extreme renal impairment is a contraindication.

In operations on the upper part of the abdomen "Pentothal Sodium" should not be used. Respiratory depression hinders the introduction of supplementary gaseous or volatile agents.

It should not be used for long operations performed with the patient in the sitting posture. (9)

The concurrent administration of sulphanilamide is a contraindication, on account of the aggravated risk of sulphæmoglobinæmia. (60)

Administration. Premedication.

Recommendations with regard to premedication vary; but the necessity for it is generally recognized, with the proviso that all dosages, especially of morphine, must be on a strictly moderate basis. Emphasis is placed on the necessity for atropine, which, by controlling parasympathetic hyperactivity and inhibiting secretions, reduces greatly the incidence of complications like coughing, sneezing and laryngospasm. (29) (30) In this series of cases the following alternatives were used:

No premedication	90 cases
Atropine only	46 cases
Morphine only	10 cases
Morphine and atropine	164 cases
Diamorphine and atropine	20 cases
Morphine and hyoscine	3 cases

The conclusions reached are as follows:

1. Premedication is not necessary for very brief and superficial procedures.

2. Atropine is essential and morphine advisable in the more lengthy procedures, especially when "Pentothal Sodium" is to be the total anæsthetic. The dosages recommended for normal adults are: atropine, 0.4 to 0.7 milligramme ($\frac{1}{150}$ to $\frac{1}{100}$ grain); morphine, 0.01 to 0.02 gramme ($\frac{1}{8}$ to $\frac{1}{4}$ grain).

3. Atropine is essential and morphine optional when "Pentothal Sodium" is to be used for basal narcosis. Morphine is best omitted in intra-abdominal work, since it favours the earlier onset of respiratory depression. Dosages suitable for normal adults are: atropine, 0.4 to 0.7 milligramme ($\frac{1}{150}$ to $\frac{1}{100}$ grain); morphine, 0.008 to 0.011 gramme ($\frac{1}{8}$ to $\frac{1}{8}$ grain).

4. If vomiting is likely, substitute diamorphine for morphine; dosage, 0.005 to 0.008 gramme ($\frac{1}{12}$ to $\frac{1}{8}$ grain).

5. Avoid hyoscine, since the barbiturate may potentiate its deliriant tendencies.

6. The use of other barbiturates is undesirable, tending to increase post-operative restlessness and possibly to have cumulative effects. (12)

7. Premedication should be given at least one hour before the anæsthetic.

Technique.

Before the injection is commenced it is advisable to place the patient in the position in which the operation will be performed. Otherwise there is a risk that the needle may be dislodged from the vein, and reentry is often difficult, as the veins become collapsed when the skeletal muscles relax. Anæsthesia lightens rapidly also, and the patient may actively resist further puncture.

The fractional or intermittent mode of administration originated by J. S. Lundy, of the Mayo Clinic, is the safest and best. (7) Occasionally the single dose method is permissible when only transient anæsthesia is required. Dosages should be determined strictly in accordance with the patient's reactions to the drug, any correlation with body weight being merely incidental. In general, young, robust, active or nervous persons will require more than the aged, frail, cachectic or placid. Suitable premedication reduces the amount of drug required, and to some extent the consequent tendency to undue respiratory depression may be combated by the addition of an analeptic ("Picrotoxin" or "Coramine") to the solution. (61) (28) (3)

The cubital veins are the best sites for injection; but if they are inaccessible the use of any other vein is permissible, such as those in the dorsum of the hand or in the leg. (62) It is of considerable

assistance to utilize venous junctions for the puncture,⁽⁶³⁾ especially when the veins are not well supported by the surrounding tissues. Owing to the danger of stasis, varicose veins should be avoided,⁽⁷⁾ and the same consideration applies to any venous constriction due to posture or tight clothing,⁽¹⁶⁾ all of which involve the risk of a sudden precipitation into the general circulation of a massive dose. When the lateral posture is being employed it is inadvisable to use the undermost arm for the injection, since the veins, although patent during consciousness, may become occluded by the weight of the body as muscular relaxation develops. Violent coughing or sneezing or expiratory spasm may have a similar effect, from arrested venous return. Injection should always be temporarily suspended during the persistence of such manifestations. Manual compression of the arm is usually sufficient to produce venous engorgement to facilitate venipuncture.⁽¹⁷⁾ Tourniquets are apt to jerk the needle from the vein when being removed.

Experience is necessary in estimating the dosage required. Until familiar with the effects of the drug, users are advised to inject it very slowly; but should adequate depth be difficult to obtain, a faster rate of injection is permissible. If we assume a predetermined maximum dosage of 0.5 gramme, the procedure is as follows:

Dissolve 0.5 gramme of the drug in 10.0 cubic centimetres of chemically pure sterile water to make a 5% solution. A wide-bore cannula on the syringe will greatly facilitate mixing, and preliminary warming of the water ampoule will hasten solution. Charge the syringe, affix a medium-sized hypodermic needle, and effect venipuncture after preparation of the overlying skin with methylated spirits or ether. The arm is best supported in semi-abduction on a flat arm-board, an assistant steadying the wrist with one hand and exerting compression with the other. Verify correct puncture by aspiration and then proceed with the injection, which is conducted at the rate of about 1.0 cubic centimetre every five seconds. Meanwhile the patient is asked to count slowly; when he ceases, note the quantity of material used and continue injecting until half as much again has been given. Then pause for from one-half to one minute, when relaxation usually will be complete and the operation may be begun. Such an amount will be enough for an operation lasting only a few minutes, and the needle may be withdrawn; but otherwise keep it *in situ* and give supplementary injections of from 0.25 to 1.0 cubic centimetre as indications arise. Such additional requirements will be found to become progressively smaller and less frequent as anaesthesia proceeds.⁽⁶⁾

The principles involved in the foregoing proceeding are identical with those used in giving an open ether anaesthetic.

The apparatus must be in good order, and should be reserved for the one purpose. Blunt needles are apt to flatten and then transfix veins. Air leaks around the syringe piston prevent delicacy of technique. Should perivenous injection or leakage occur, it is advisable to infiltrate the area with about 5.0 cubic centimetres of normal saline solution to reduce local irritation. After some experience one begins to appreciate the characteristic ease of inflow with a proper location and the resistance opposed to perivenous injection. Repeated aspira-

tion tests favour the formation of blood clot in the needle, and at times, even with a correct location, are useless, because the vein wall is sucked up against the needle orifice. It is best to keep the solution moving inwards by repeated small injections⁽²³⁾ and to rely on the sensation of free inflow for confirmation of location.

Phenomena of Anaesthesia.

The chief sign of anaesthesia is the character of the respiration, which becomes progressively shallower as the depth of anaesthesia increases.⁽⁶⁾ Unless the injection is given very slowly, yawning is not a common feature of the induction. The jaw soon relaxes and the tongue falls back, causing respiratory obstruction, which is apt to be at first overlooked owing to the dramatic speed with which this stage is reached. It is essential to support the chin firmly throughout the administration to ensure a clear airway, for which, because of the absence of local congestion, the nasal passages are usually quite adequate. This feature is of great value in dental and oral work, permitting complete faucial occlusion.⁽⁶⁸⁾ If necessary, an artificial pharyngeal airway may be inserted; but this must not be done too soon, since laryngospasm or retching may be thereby induced. Because of the shallow breathing, the maintenance of a perfectly clear airway is of paramount importance, the slightest obstruction impeding gaseous exchanges.

Lightness of anaesthesia is indicated by the increasing depth of respiration. A warning is here necessary, however: should obstruction have occurred, respiratory efforts will be increased because of oxygen want and carbon dioxide retention. Further injection in such circumstances will, of course, lead to a most alarming situation. Relief of the obstruction will dissipate the stimuli to hyperpnoea, and shallow breathing will recur in a manner which is somewhat disconcerting until the reason is understood. With some experience the type of respiration characteristic of either free or obstructed airways becomes recognized; the first is effortless and expansive, if shallow; the second laboured and of "see-saw" character, the abdomen and lower part of the chest rising while the upper part of the chest appears to retract. The "butterfly" devised by Lundy⁽⁷⁾ is of value here, being a positive indicator of breathing. A large wisp of cotton-wool is so affixed to the upper lip as to move to and fro with air currents passing through either the nose or the mouth. It is a very useful indicator for nurses or assistants in charge of the chin, both during and after operation, and also for the anaesthetist when he is working at a distance.

Additional signs of lightness of anaesthesia are slight movements, phonation and frowning. With adequate depth the corneal reflex is either very sluggish or absent, the eyeballs are centrally fixed, the pupils are small or semi-dilated and react to light, and the eyelids are quite flaccid. The pupils may be dilated if the patient has been in a state of nervous tension beforehand. The conjunctivae

have a suffused appearance. With a clear airway the colour remains good, despite shallow breathing. Duskiness or cyanosis means either profound respiratory depression from excessive depth or respiratory obstruction. The administration of oxygen or "Carbogen" is valuable in such circumstances, any obstruction, of course, being first relieved.

The attempted performance of tracheal intubation after induction of anaesthesia with "Pentothal Sodium" will often induce a very persistent laryngospasm. Inhalation of saliva, blood or vomitus may have a similar effect, so that their formation or access should be guarded against. Very occasionally this spasm comes on spontaneously, especially in nervous patients. Given time, it will always relax; and although alarming cyanosis may have developed, the risk of myocardial damage seems to be slight, since the lungs are free from any toxic vapour and the circulating agent is undergoing rapid elimination. It is a grave error to perform forcible intubation in such circumstances; permanent damage may be done to the larynx. Intrapharyngeal insufflation of oxygen should be begun at once, so that when breathing is resumed relief shall be immediate.

Uterine tone is very well maintained during anaesthesia with "Pentothal Sodium". The effect on the foetus is slight, and the new-born infant rapidly eliminates any that it might have absorbed before ligation of the cord.

The time taken for recovery of consciousness is roughly proportional to the amount of drug given, although the state of metabolic activity and the presence of pain introduce variations. Very often the patient may be roused and will open his eyes and speak, afterwards falling to sleep again. Prolonged unconsciousness is usually due to overdosage or delayed elimination. The unusual quiescence, shallow breathing and soft pulse may alarm the uninitiated, and the gravity of the situation may be overestimated. If post-anaesthetic depression seems to be unduly profound, oxygen insufflation should be begun and "Coramine" given intravenously in doses of 5.0 to 10.0 cubic centimetres, repeated as required. During unconsciousness the lateral posture is the safest, since the jaw and tongue fall forward and so a clear airway is ensured. Transportation should be effected with the patient in this position, and it should be adopted after his return to bed. Once the tone of the jaw has returned, further anxiety on this score is unnecessary, since free breathing will be assured even if unconsciousness persists. Restlessness during recovery is usually due to pain and is readily controlled by ordinary dosages of morphine. It should not be forgotten that "Pentothal Sodium" is essentially a hypnotic and not an analgesic.⁽⁶⁴⁾

Analysis of Cases.

In this series of cases "Pentothal Sodium" was used as a total anaesthetic or as an adjuvant to local analgesia in 168 cases, and as a basal narcotic

or for induction of anaesthesia in 165. The operations performed are shown in Tables Ia, Ib and II.

Of the deaths in the series (8), none occurred during the administration of the drug or supplementary agent, and none was attributable to the anaesthetic (Table III).

Supplementary Agents.

In the 165 cases in which "Pentothal Sodium" has been classified as a basal narcotic, the following adjuvants were used:

	Number of Times Used.
Ether	8
Chloroform	4
Ethyl chloride and ether	1
Nitrous oxide and oxygen	21
Nitrous oxide, oxygen and ether	5
Nitrous oxide, oxygen and chloroform	1
Nitrous oxide, oxygen and cyclopropane	90
Nitrous oxide, oxygen, cyclopropane and ether	17
Nitrous oxide, oxygen, chloroform and ether	1
Cyclopropane and oxygen	9
Cyclopropane, oxygen and ether	4
Spinal anaesthesia (inadequate analgesia)	1
Spinal anaesthesia, nitrous oxide and oxygen (inadequate analgesia)	1
Local analgesia	2

Ether had to be given very cautiously, to avoid exciting cough and other laryngeal reflexes. Chloroform was used only when excess oxygen was available; otherwise it is contraindicated because of the respiratory depression produced by the injected drug, which, nevertheless, by causing reduced sympathetic activity, allays the risk of ventricular fibrillation. The combinations of nitrous oxide and oxygen, and of nitrous oxide, oxygen and cyclopropane were found to be the ideal adjuvants. Cyclopropane and oxygen alone were not considered to be so satisfactory. Ether was added freely whenever relaxation was inadequate; such was often the case in intraabdominal work. In the second spinal anaesthetic case in the above list, not only was the analgesia inadequate, but the patient was extremely nervous and the surgeon restive. "Pentothal Sodium" afforded immediate relief to all concerned, and extricated the anaesthetist from an embarrassing situation. Theoretically the combination is questionable, in view of the fall in blood pressure involved; but in practice this is of little significance when a nitrous oxide apparatus is available.

Complications.

The incidence of complications is comparatively rare during and after "Pentothal Sodium" anaesthesia. A very careful record was made of those occurring in this series of cases, even if of trivial character. They were almost invariably of minor degree when the drug was used as the total anaesthetic, the more severe depending rather on the nature of the operation or supplementary agent than on the basal narcotic.

TABLE IA.

Analysis of 327 Successful Cases in which "Pentothal Sodium" was Used.

Type of Operation.	Total Number of Cases.	"Pentothal Sodium" Total Anesthetic Agent.			"Pentothal Sodium" used as Basal Narcotic.		
		Procedure Carried Out.	Number of Cases.	Total.	Procedure Carried Out.	Number of Cases.	Total.
General surgical procedures.	64	Diathermy	3	10	Herniotomy	4	54
		Biopsy (tongue)	1		Excision of tumour of breast	2	
		Implantation of radium	1		Appendicectomy	9	
		Excision of rodent ulcer	1		Cholecystectomy	3	
		Suture of lacerated lip	1		Thoracotomy	10	
		Hemorrhoidectomy	1		Thoracoplasty	14	
		Dilatation of anal sphincter	1		Pulmonary lobectomy	3	
		Removal of toenail	1		Oesophagectomy	1	
					Laparotomy	1	
					Amputation of thigh	1	
					Ligation of femoral artery	1	
					Exploration of fractured femur	1	
					Excision of adenoma of thyroid	1	
Gynaecological.	41	Curettage	19	24	Hysterectomy	7	17
		Implantation of radium	2		Vaginal plastic operation	5	
		Colpotomy	1		Cesarean section	2	
		Cauterization	1		Excision of ovarian dermoid cyst	1	
		Vaginal examination	1		Curettage and section	1	
Orthopaedic.	14			11	Implantation of radium	1	3
		Manipulations (including two of the cervical part of the spine)	6		Reduction of Pott's fracture	1	
		Reduction of fracture	1		Excision of scars of legs	1	
		Stretching of sciatic nerve	1		Cure of hammer toes	1	
		Sequestrectomy	1				
		Drilling of calcaneus	1				
Ear, nose and throat.	73	Excision of navicular bone of wrist	1	51	Tonsillectomy	16	22
		Bronchoscopy (with local anaesthesia)	33		Antrostomy	3	
		Oesophagoscopy (with local anaesthesia)	7		Mastoidectomy	1	
		Laryngoscopy (with local anaesthesia)	2		Plastic operation to septum	1	
		Intubation, with lipiodol (local anaesthesia)	1		Bronchoscopy	1	
		Bronchoscopy (without local anaesthesia)	1		Oesophagoscopy (with local anaesthesia)	1	
		Antrostomy	3				
		Submucous resection of septum	1				
		Implantation of radium	1				
		Plastic operation on frontal fistula	1				
Ophthalmic.	8	Diathermy to pharynx	1	7			1
		Removal of eye	4		Cure of squint	1	
		Extraction of lens	2				
Urological.	103	Excision of prolapsed iris	1	40			63
		Cystoscopy	6		Cystoscopy	1	
		Cystoscopy and diathermy	7		Cystoscopy and diathermy	1	
		Cystoscopy and ureteral catheterization	6		Cystoscopy and ureteral catheterization	4	
		Cystoscopy and ureteral dilatation	7		Cystoscopy and ureteral dilatation	1	
		Lithotripsy	2		Lithotripsy	1	
		Cystotomy	2		Cystotomy	6	
		Excision of urethral caruncle	2		Endoscopic resection of prostate	2	
		Urethroscopy	1		Prostatectomy	13	
		Dilatation of urethral stricture	1		Nephrectomy	19	
		Internal urethrotomy	1		Nephrolithotomy	6	
		Hydrostatic distension of bladder	1		Nephrolysis	4	
		Endoscopic resection of prostate	1		Ureterolithotomy	2	
		Hemostasis (packing)	1		Ureterostomy	1	
		Incision of perineal abscess	1		Curettage of lumbar sinus	1	
		Incision of scrotal abscess	1		Removal of packing	1	
Neurological.	2						
		Ventriculography	1	1	Laminectomy	1	1
Dental.	22			19			3
		Extractions	16		Extractions	3	
		Incision of alveolar abscess	2				
		Making of cast of palate	1				
Totals				163			164

TABLE IB.
Analysis of Six Unsuccessful Cases in which "Pentothal Sodium" was Used.¹

"Pentothal Sodium" Total Anaesthetic.			"Pentothal Sodium" used as Basal Narcotic.		
Operative Procedure.	Number.	Total.	Operative Procedure.	Number.	Total.
Excision of lip	1	6	Thoracoplasty .. .	1	1
Cure of squint .. .	1				
Bronchoscopy .. .	2				
Excision of axillary tumour .. .	1				

¹ The six failures were not due to any lack of potency or to abnormal effects of the agent, but to deficiencies in technique or apparatus.

TABLE II.
Reasons for Six Failures.

Patient's Number.	Sex.	Age (Years).	Operation.	Comment.
12	M.	70	Excision of lip.	Air leakage around syringe piston.
22	M.	8	Cure of squint.	Rapid elimination and dislodgement of needle.
27	M.	—	Bronchoscopy.	Inadequate premedication with cocaine.
223	F.	39	Excision of tumour.	Air leaks around syringe piston.
273	F.	31	Thoracoplasty.	Inability to locate vein.
328	F.	16	Bronchoscopy.	Vein transected and spoiled.

TABLE III.
Causes of Death.

Patient's Number.	Sex.	Age (Years.)	Operation.	Technique.	Amount of "Pentothal Sodium" (Milligrammes.)	Adjuvants.	Period after Operation.	Cause.
26	M.	72	Hæmostasis (post-prostatectomy).	Total.	700	Nil.	5 days.	Gangrene.
65	M.	41	Nephrectomy.	Induction.	500	Cyclopropane, ether.	7 days.	Ileus.
129	M.	About 70	Esophagectomy. ¹	Basal.	1000	Nitrous oxide, cyclopropane.	24 hours.	Shock.
136	F.	About 17	Thoracotomy. ²	Basal.	1000	Nitrous oxide, cyclopropane.	10 hours.	Shock.
139	M.	84	Prostatectomy.	Induction.	300	Nitrous oxide, cyclopropane.	8 days.	Uremia.
184	M.	31	Nephrectomy. ²	Basal.	900	Nitrous oxide, cyclopropane.	2 hours.	Hæmorrhage.
246	M.	67	Herniotomy.	Basal.	500	Nitrous oxide, cyclopropane.	2 days.	Peritonitis.
322	M.	20	Esophagectomy.	Total.	850	Nil.	28 hours.	Tuberculosis.

¹ Had "Pentothal Sodium" twice, nineteen and three days previously, for bronchoscopy and thoracotomy respectively, without apparent ill effect.

² Suffered severe blood loss during operation.

In many instances more than one of the complications occurred in the one case. The slight incidence of vomiting was remarkable. It occurred once only when "Pentothal Sodium" was the sole agent used. In the remainder, morphine was a common factor, frequently precipitating the onset

TABLE IV.
Complications Encountered.

Use as Total Anaesthetic.		Use as Basal Narcotic.	
Complication.	Number of Cases.	Complication.	Number of Cases.
Violent coughing .. .	3	Profound respiratory depression .. .	4
Sneezing .. .	2	Operative hæmorrhage .. .	1
Laryngospasm (spontaneous) .. .	3	Surgical shock .. .	10
Prolonged apnoea .. .	1	Delayed elimination .. .	1
Expiratory spasm .. .	3	Restlessness during recovery .. .	9
Bronchial inundation (pus) .. .	2	Vomiting .. .	32
Restlessness during recovery .. .	6	Tympanites .. .	1
Vomiting .. .	5	Paralytic ileus .. .	2
Delayed elimination .. .	2	Peritonitis .. .	1
Post-anæsthetic inebriation .. .	1	Tracheo-bronchitis .. .	2
Perivascular inflammation .. .	1	Bronchopneumonia .. .	2
Venous thromboses .. .	2	Post-operative mania .. .	1
		Uremia .. .	1
		Perivascular inflammation .. .	1
		Embolism .. .	1
		Gangrene of wound .. .	1

of the complication long after recovery of consciousness. Cough and spasm were almost invariably due to blood or secretions irritating the larynx. Nervous persons seemed more prone to them. Sneezing occurred in two of the eye cases, possibly from a bright light shining in the eyes. The usual cocaine medication should not be omitted in such cases. A low glycogen reserve due to relative starvation from trismus accounted for the three cases of delayed elimination, while prolonged apnoea and profound respiratory depression were due to overdosage. The instance of post-anæsthetic inebriation seemed to be largely associated with injudicious comments made by the surgeon during the induction; the patient was extremely resentful and abusive during recovery, and yet completely oblivious of his remarkable behaviour on the following day. Infiltration with normal saline solution was practised in the two cases of perivascular injection. A firm and very tender swelling appeared after some days; frequent hot fomentations were applied, and the lesion subsided without sloughing. Expiratory spasm and bronchial inundation with pus were features of some bronchoscopic examinations, in which the preliminary local analgesia was possibly imperfect. Efficient con-

tinuous suction was the essential treatment, while a tube delivering "Carbogen" or oxygen was attached to the insufflation inlet of the bronchoscope. The suction not only removed the obstructing secretions, but effected a most efficient diffusion of oxygen about the end of the instrument in the region of the tracheal bifurcation. Adequate oxygenation may be thus effected even in the absence of respiratory movements. In one case death seemed imminent, the pulse being slow and most irregular; the intravenous administration of 5.0 cubic centimetres of "Coramine", together with the endotracheal insufflation of oxygen, effected rapid recovery, although the patient remained exhausted for some hours afterwards. This was a case in which the myocardium had suffered from the effects of chronic toxæmia and was very intolerant of oxygen deprivation.

Acknowledgements.

I am deeply indebted to Dr. R. H. Bridge, Dr. K. L. H. Kirkland, Dr. M. P. Susman, Dr. B. B. Blomfield and other members of the surgical staff of Sydney Hospital for their interest, cooperation, and tolerance of much inconvenience and sometimes alarm during the period of investigation and assessment of this new drug. As a result it has become established as an absolute necessity in the work of the hospital, and a better conception of its scope and limitations has been realized. I should also like to express appreciation of the assistance given by various members of the nursing staff and the instrument assistants.

References.

- ⁽¹⁾ J. T. Gwathmey: "Anesthesia", 1914, page 523.
- ⁽²⁾ D. E. Hale: "Intravenous Anesthesia", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume X, November 20, 1935, page 743.
- ⁽³⁾ J. S. Lundy: "Intravenous Anesthesia", *The American Journal of Surgery*, Volume XXXIV (New Series), December, 1936, page 559.
- ⁽⁴⁾ E. B. Tuohy: "Anesthetic Procedures used at the Mayo Clinic. I. General Consideration of Local, Inhalation and Intravenous Anesthetic Agents and Methods and Premedication", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XIII, May 4, 1938, page 284.
- ⁽⁵⁾ J. S. Lundy and R. M. Tovell: "Some of the Newer Local and General Anesthetic Agents", *Northwest Medicine*, Volume XXXIII, September, 1935, page 393.
- ⁽⁶⁾ J. S. Lundy and R. M. Tovell: "Annual Report for 1934 of the Section on Anesthesia, including Data on Blood Transfusion", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume X, April 24, 1935, page 257.
- ⁽⁷⁾ J. S. Lundy: "Intravenous Anesthesia: Preliminary Report of the Use of Two New Thiobarbiturates", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume X, August 21, 1935, page 536.
- ⁽⁸⁾ J. S. Lundy, E. B. Tuohy and R. C. Adams: "Annual Report for 1937 of the Section on Anesthesia, including Data on Blood Transfusion", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XIII, March 23, 1938, page 177.
- ⁽⁹⁾ R. Jarman and A. L. Abel: "Intravenous Anesthesia with Pentothal Sodium", *The Lancet*, February 22, 1936, page 422.
- ⁽¹⁰⁾ R. Jarman and A. L. Abel: "Technique of Intravenous Anesthesia", *The Lancet*, March 14, 1936, page 600.
- ⁽¹¹⁾ O. J. Murphy: "Pentothal Sodium Anesthesia", *The British Medical Journal*, December 24, 1936, page 1208.
- ⁽¹²⁾ P. B. Mallinson: "Pentothal Sodium in Intravenous Anesthesia", *The Lancet*, November 6, 1937, page 1070.
- ⁽¹³⁾ C. P. Dixon: "Some Observations on Pentothal Sodium", *The British Journal of Anaesthesia*, Volume XV, January, 1938, page 60.
- ⁽¹⁴⁾ J. S. Lundy: "The Usefulness of Anesthetic Agents", *The Canadian Medical Association Journal*, Volume XXXIII, November, 1935, page 490.
- ⁽¹⁵⁾ K. M. Heard: "Pentothal: A New Intravenous Anesthetic", *The Canadian Medical Association Journal*, Volume XXXIV, June, 1935, page 628.
- ⁽¹⁶⁾ R. C. Adams: "The Present Status of Intravenous Administration of Pentothal Sodium in Institutional and Private Practice", *The Canadian Medical Association Journal*, Volume XXXVIII, April, 1938, page 330.
- ⁽¹⁷⁾ C. W. H. Van der Post: "Pentothal Sodium in Anesthetics", *South African Medical Journal*, Volume X, September 12, 1936, page 599.
- ⁽¹⁸⁾ C. W. H. Van der Post: "Further Experiences with Pentothal Sodium", *South African Medical Journal*, Volume XII, June 26, 1938, page 421.
- ⁽¹⁹⁾ S. V. Marshall: "Recent Progress in Anesthesia", *THE MEDICAL JOURNAL OF AUSTRALIA*, January 2, 1937, page 7.
- ⁽²⁰⁾ G. Brown and G. Troup: "Experiences with 'Pentothal Sodium'", *THE MEDICAL JOURNAL OF AUSTRALIA*, June 11, 1938, page 989.
- ⁽²¹⁾ H. W. Werner, T. W. Pratt and A. L. Tatum: "A Comparative Study of Several Ultrashort-acting Barbiturates, Nembutal and Tribromethanol", *The Journal of Pharmacology and Experimental Therapeutics*, Volume LX, June, 1937, page 189.
- ⁽²²⁾ B. M. Carraway and C. N. Carraway: "Intravenous Anesthesia: A Study of 1,900 Cases", *The American Journal of Surgery*, Volume XXXIX (new series), March, 1938, page 576.
- ⁽²³⁾ J. H. Hutton and R. M. Tovell: "Pentothal Sodium for Intravenous Anesthesia", *Surgery, Gynecology and Obstetrics*, Volume XLIV, May, 1937, page 888.
- ⁽²⁴⁾ J. S. Lundy, R. M. Tovell and E. B. Tuohy: "Annual Report for 1935 of the Section on Anesthesia, including Data on Blood Transfusion", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XI, July 1, 1936, page 421.
- ⁽²⁵⁾ Willa A. Cameron: "Pentothal Sodium as an Intravenous Anesthetic", *Current Researches in Anesthesia and Analgesia*, Volume XVI, July-August, 1937, page 230.
- ⁽²⁶⁾ M. G. Mullins: "Anesthetic Properties of Sodium Ethyl-pentylmalonyl Thiourea", *The Proceedings of the Society for Experimental Biology and Medicine*, Volume XXXIV, May, 1936, page 506.
- ⁽²⁷⁾ O. M. Gruhsit, A. W. Dox, L. W. Rowe and M. C. Dodd: "A Pharmacologic Study of Certain Thiobarbiturates", *The Journal of Pharmacology and Experimental Therapeutics*, Volume LX, June, 1937, page 125.
- ⁽²⁸⁾ E. B. Tuohy: "Intravenous Anesthesia with Pentothal Sodium", *Current Researches in Anesthesia and Analgesia*, Volume XVI, May-June, 1937, page 164.
- ⁽²⁹⁾ C. L. Burstein: "Effect of Some Short-acting Barbiturates on the Patency of the Glottis", *Proceedings of the Society for Experimental Biology and Medicine*, Volume XXXVII, October, 1937, page 267.
- ⁽³⁰⁾ C. L. Burstein and E. A. Rovenstine: "Respiratory Parasympathetic Action of Some Shorter-acting Barbituric Acid Derivatives", *The Journal of Pharmacology and Experimental Therapeutics*, Volume LXIII, May, 1938, page 42.
- ⁽³¹⁾ C. M. Gruber: "On Certain Pharmacologic Actions of the Newer Barbituric Acid Compounds", *The American Journal of Obstetrics and Gynecology*, Volume XXXIII, May, 1937, page 729.
- ⁽³²⁾ C. M. Gruber: "The Effects of Anesthetic Doses of Sodium Thio-pentobarbital, Sodium Thio-ethylamyl and Pentothal Sodium on the Respiratory System, the Heart and Blood-pressure in Experimental Animals", *The Journal of Pharmacology and Experimental Therapeutics*, Volume LX, June, 1937, page 143.
- ⁽³³⁾ C. M. Gruber, V. G. Haurly and C. M. Gruber, junior: "The Cardiac Arrhythmia, Characteristic Effect of the Thiobarbiturates (Pentothal, Thio-pentobarbital and Thio-ethylamyl) as Influenced by Changes in Arterial Blood-pressure", *The Journal of Pharmacology and Experimental Therapeutics*, Volume LXIII, June, 1938, page 193.
- ⁽³⁴⁾ H. L. Widenhorn, J. F. Volini and R. F. McLaughlan: "The Effect of General, Local and Intravenous Anesthetics on the Experimental Electrocardiogram", *Current Researches in Anesthesia and Analgesia*, Volume XVII, March-April, 1938, page 93.
- ⁽³⁵⁾ R. Kohn and L. Lederer: "Pentothal: Studies with Special Reference to the Electrocardiogram", *The Journal of Laboratory and Clinical Medicine*, Volume XXIII, April, 1938, page 717.
- ⁽³⁶⁾ P. P. Volpito and M. B. Marangoni: "Electrocardiographic Studies during Anesthesia with Intravenous Barbiturates", *The Journal of Laboratory and Clinical Medicine*, Volume XXIII, March, 1938, page 576.
- ⁽³⁷⁾ G. J. Thomas: "Clinical and Laboratory Observations on Intravenous Anesthesia", *Current Researches in Anesthesia and Analgesia*, Volume XVII, May-June, 1938, page 163.
- ⁽³⁸⁾ C. J. Betlach: "The Effects of Pentothal Sodium on the Electrocardiogram of Patients with Essential Hypertension", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XIII, March 23, 1938, page 183.
- ⁽³⁹⁾ C. Reynolds and J. R. Veal: "Circulatory Effects of Pentothal Sodium", *Proceedings of the Society for Experimental Biology and Medicine*, Volume XXXVII, January, 1938, page 627.
- ⁽⁴⁰⁾ R. M. Waters and E. R. Schmidt: "Cyclopropane Anesthesia", *The Journal of the American Medical Association*, Volume CIII, September 29, 1934, page 975.
- ⁽⁴¹⁾ C. H. Smith: "Use of Sodium Pentothal Anesthesia for a Patient with a Tendency to Thrombosis and Embolism", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XII, April 14, 1937, page 239.

- (40) E. V. Allen, J. S. Lundy and A. W. Adson: "Preoperative Prediction of Effects on Blood-pressure of Neurosurgical Treatment of Hypertension", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XI, June 24, 1936, page 401.
- (41) E. Hausner, H. E. Essex and F. C. Mann: "Roentgenologic Observations of the Spleen of Dogs under Ether, Sodium Amytal, Pentobarbital Sodium, and Pentothal Sodium Anesthesia", *The American Journal of Physiology*, Volume CXXI, February, 1933, page 357.
- (42) J. M. Vaisey: "Toxic Jaundice following Administration of Pentothal", *The British Journal of Anaesthesia*, Volume XV, January, 1933, page 55.
- (43) S. N. Blackberg and Caroline Hrubetz: "Factors Influencing Pentothal Anesthesia", *The Journal of Laboratory and Clinical Medicine*, Volume XXII, September, 1937, page 1224.
- (44) M. C. Hrubetz and S. N. Blackberg: "The Influence of Nembutal, Pentothal, Seconal, Amytal, Phenobarbital and Chloroform on Blood-sugar Concentration and Carbohydrate Metabolism", *The American Journal of Physiology*, Volume CXXII, June, 1933, page 753.
- (45) R. Jarman: "The Combination of Intravenous with Spinal Anesthesia, using Pentothal and Percaine", *The British Journal of Anaesthesia*, Volume XV, October, 1937, page 20.
- (46) J. S. Horsley: "Pentothal Sodium in Mental Hospital Practice", *The British Medical Journal*, May 9, 1936, page 938.
- (47) J. S. Horsley: "Narco-analysis", *The Journal of Mental Science*, Volume LXXXII, July, 1936, page 416.
- (48) Wesley Bourne: "Analgesia and Anesthesia in Obstetrics: Pentothal Sodium, Cyclopropane and Vinyl Ether", *The British Journal of Anaesthesia*, Volume XV, October, 1937, page 1; also *The New York State Journal of Medicine*, Volume XXXVII, November 15, 1937, page 1905.
- (49) F. L. MacPhail, H. R. Dunstan Gray and Wesley Bourne: "Pentothal Sodium as a Hypnotic in Obstetrics", *The Canadian Medical Association Journal*, Volume XXXVII, November, 1937, page 471.
- (50) G. J. Thompson: "Transurethral Surgery in 1934", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume X, April 3, 1935, page 220.
- (51) G. J. Thompson: "Transurethral Surgery in 1935", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XI, June 3, 1936, page 360.
- (52) R. M. Tovell and G. J. Thompson: "Pentothal Sodium Anesthesia in Urologic Practice", *The Journal of Urology*, Volume XXXVI, July, 1936, page 31.
- (53) E. Solomons: "Pentothal Sodium in Obstetrics", *The Irish Journal of Medical Sciences*, December, 1936, page 746.
- (54) F. A. Kassebohm and M. J. Shreibler: "Intravenous Anesthesia in Obstetrics: A Comparative Study of Pentothal and Evipan Soluble, with a Report of 250 Cases", *The American Journal of Surgery*, Volume XL, May, 1933, page 377.
- (55) J. S. Horsley: "Intravenous Anesthesia for Childbirth in a Mental Hospital", *The Lancet*, March 21, 1936, page 690.
- (56) S. V. Marshall: "Improved Methods of General Anesthesia for Dental and Oral Surgery", *The Dental Journal of Australia*, Volume IX, November 1, 1937, page 639.
- (57) J. S. Lundy, E. B. Tuohy and R. C. Adams: "Annual Report for 1936 of the Section of Anesthesia, including Data on Blood Transfusion", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XII, April 14, 1937, page 225.
- (58) C. L. Hewer: "Sulphanilamide and Pentothal Sodium", *The British Medical Journal*, May 14, 1938, page 1068.
- (59) J. S. Lundy: "A Method of Minimizing Respiratory Depression when using Soluble Barbiturates Intravenously", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume X, December 11, 1935, page 791.
- (60) J. S. Lundy: "Suggestions to Facilitate Venipuncture in Blood-transfusion, Intravenous Therapy and Intravenous Anesthesia", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XII, February 24, 1937, page 123.
- (61) C. G. K. Thompson: "The Intravenous Route: A New Method and Apparatus", *The Lancet*, May 23, 1936, page 1173.
- (62) T. W. Pratt, A. L. Tatum, H. R. Hathaway and R. M. Waters: "Sodium Ethyl (1-Methyl Butyl) Thiobarbiturate: Preliminary Experimental and Clinical Study", *The American Journal of Surgery*, Volume XXXI (new series), March, 1936, page 464.

NON-UNION OF THE CARPAL NAVICULAR BONE.¹

By F. H. McC. CALLOW,
Sydney.

For many years the accepted opinion was that when the navicular bone was fractured, the usual result was non-union, and, of course, this was actually true in the great majority of cases. The reasons for this were our ignorance of the detailed process of bone healing, and particularly the fact that we had but a very poor idea of the length of time necessary for union to occur in any

bone. In other words, non-union in fractures of this bone were due to the fact that they were badly treated—that is, inefficiently splinted and for an insufficient period.

You all know the pathology and histology of a healing fracture, so I shall do no more than point out that the essential conditions for satisfactory union are the following: (i) an undisturbed blood clot, (ii) absolute fixation for a sufficient period, (iii) adequate circulation in the whole limb.

These ought naturally to follow accurate reduction of any displacement.

There are, however, certain peculiarities in certain fractures, especially those of the navicular.

It must be remembered that in a long bone surrounded by muscles, union is clinically firm early, because of the mass of callus which forms under the stripped-up periosteum. This acts as an efficient splint until the new trabeculation forms across the fracture site. This final reconstruction takes at least two or three times as long as is required for the external callus to form and hold firmly. In a fracture of the lower end of the radius, the bone feels quite strong again in three or four weeks after fracture. However, a careful examination of the X ray films will show that the trabeculae of bone cannot be followed from one fragment to the other, actually between the fragments, until some weeks later.

In the navicular, a fracture is unable to heal in the same manner, because of anatomical differences, such a large amount of the bone being intra-articular; and there is at no point any loosely attached periosteum. Therefore there is no outer buttress to support the fracture, owing to the absence of a subperiosteal hematoma, and consequently splinting must be persisted in for a sufficient period to allow of actual end-to-end union. Another reason for delay is the fact that without the retaining periosteum, the blood clot, which is the basis on which callus forms, is diluted and washed away by the synovial fluid. The same thing applies, of course, to fractures of the neck of the femur. I do not believe that the synovial fluid has any specific effect in preventing the formation of a callus, but acts only as a diluent.

The blood supply to a bone comes from three sources: (a) the nutrient artery, which is the least important; (b) the larger vessels about the ends of the bone; and (c) the minute periosteal vessels over the entire surface, which are particularly numerous where there are fleshy, muscular attachments. Obviously the blood supply to the navicular is poor.

To fulfil the conditions necessary for firm union, there must not be repeated manipulation, which breaks up the young callus; splinting must be particularly good; and use of the hand and arm generally must be encouraged. Unless the present method of medical education is altered, at least 90% of medical men will go into practice without the ability to splint properly a wrist or any other part of the body.

¹Read at the annual meeting of the Australian Orthopaedic Association (British Medical Association) in March, 1938.

Normally, at least eight or ten weeks are required before movement of the wrist is permitted. During this time, however, it is of the utmost importance that vigorous active use be made of the limb. If these conditions are fulfilled, almost all fractured naviculars will unite satisfactorily in from eight to twenty weeks.

Non-union is the result of defective treatment, which may be due to the following factors. First, many fractures of the navicular remain undiagnosed for many weeks or even years. It must be remembered that an X ray film does not reveal more than about half of all recent fractures. However, in two or three weeks some absorption takes place, and radiographic diagnosis is easy. The trouble is that the second X ray examination is rarely made. All wrist injuries accompanied by local tenderness over the navicular must be treated as fractures—that is, splinted and then after two or three weeks reexamined. The second factor is that inefficient splinting is usually relied on.

From these considerations it is seen that non-union is still common.

Treatment of Delayed Union.

Delayed union may be treated in several ways. The first is conservative treatment—that is, prolonged fixation associated with active use. This requires as a rule six months, and the result is not at all certain.

Operative removal of the whole or fraction of the navicular has, in my opinion, but little place in the treatment of this condition, as I have never seen a completely satisfactory result from this procedure. Insurance companies' statistics show that a fractured navicular, ununited, means 10% loss of efficiency of the arm. Operation does not improve this figure, and in addition deformity results from the operation.

The operation of choice is cross drilling between the two fragments. Some surgeons apparently follow the technique of drilling under X ray control, without an excision; but this is unnecessarily difficult, and has the disadvantage of possibly wounding important structures.

There can be surely no objection to an incision and drilling carried out under direct vision.

I have found it best to apply a skeleton splint for about ten days, until the operative swelling has abated; then a plaster splint of special type is applied directly to the skin, without intervening padding. This is left for twelve weeks, when it is removed and an X ray examination is made. If union is apparent clinically and radiographically, the splint is discarded; if not, a new one is applied. In no circumstances must movement be allowed during this procedure. Removal of the splint and X ray examination by the surgeon himself are the most satisfactory method. To allow a patient to wander about without a splint for twenty-four hours, as is usually done, is fatal to a good result. In my cases, the patient does not move during the whole procedure.

No physical therapy is used during any stage of treatment. When the splint is discarded, it is found that the fingers move fully, and that the wrist has about one-third to half normal range, according to the length of time of splinting.

Three or four months are required before free movement is regained. Work is usually possible one month after removal of the splint, although in many cases work is begun immediately after the application of plaster.

Up to the present I have operated on thirteen patients. The period elapsing between injury and operation ranged from eleven years to nine months. Union after operation took place in from eleven to twenty-eight weeks, the average being nineteen weeks. In all cases in which treatment has been completed bony union has occurred with the exception of one, in which it is doubtful, as radiologists differ as to the interpretation of the X ray film.

The factors apparently influencing the rate of union are the following: (i) the site of fracture—the more proximal fractures take longer to heal; (ii) the extent of the sclerosis in the proximal fragment, which is usually associated with old-standing fractures and with osteoarthritis.

The presence of a large area of absorption does not appear to cause any delay, because operation fills this cavity with blood clot, and it rapidly ossifies. As a matter of fact, I have the impression that such an area helps to secure union, as it circumscribes the blood clot and keeps it undisturbed; but of course my series of cases is too small to enable me to be dogmatic. In addition, the mere fact of absorption of bone indicates an efficient blood supply.

Another factor which appears to have some effect in causing delay in union is the association of a carpal dislocation with the fracture, as in the perilunar transnavicular dorsal dislocation of the wrist. One must presume that in such a case there is more disturbance of blood supply.

This method has given me very good results; but I feel that if a better or fresher mass of blood and bone could be introduced into the fracture site, union might be obtained in a shorter period.

Reports of Cases.

APPARENT CURE IN A CASE OF SUBACUTE BACTERIAL ENDOCARDITIS.

By F. E. WELCH, M.B., B.S. (Adelaide),
Kingscote, Kangaroo Island,

AND

A. R. SOUTHWOOD, M.D., M.S. (Adelaide), M.R.C.P.
(London),

Honorary Physician, Adelaide Hospital.

MOST sufferers from subacute bacterial endocarditis (*endocarditis lenta*) die from their disease. In his excellent monograph on the subject, Bruce Perry mentions that complete healing of the endocardial lesion may sometimes

occur, but states that in most of the "recovered" cases the diagnosis is not beyond question. Clinicians are now well acquainted with the main features of the disease, elucidated so well by Osler, Horder and Lewis in England, by Schottmüller in Germany, and by Libman in New York, and accuracy of diagnosis may reasonably be expected. Cure, although not the rule, sometimes occurs, and Libman has cited at least ten cases in which an organism was obtained on blood culture at some stage and in which recovery had ultimately occurred. It is fair to say that once the diagnosis of subacute bacterial endocarditis is established, the prognosis must always be gloomy, but it need not be hopeless.

As we are dealing with so fell a disease, it is proper that any instance of apparent cure should be published. In the case here discussed we submit that the diagnosis is unquestionable, and the outlook is so far encouraging. For over a year the patient was ill in bed with an irregular fever of hectic type, and now for two years fever has been absent, and general good health has been maintained.

Clinical Record.

The patient, a woman, aged thirty-two years, was admitted to hospital early in June, 1936. In childhood she had chorea, and had attacks of rheumatic fever at nine years and eighteen years of age. At twenty-six years of age she had a pelvic operation, probably for salpingitis. She had been married for five years, but had no children. She had been able to do her ordinary duties as a housewife on a farm.

In December, 1935, she developed a febrile illness. She was admitted to a country hospital, and the illness was diagnosed as due to pneumonia and pleurisy. While convalescing in January, 1936, she had attacks of pain in the upper part of the abdomen. The attacks were irregular in their time incidence. During April and May, 1936, the pain had been practically constant. She tired easily and was feverish at times. She lost weight, the appetite was poor, she slept badly and had occasional night-sweats. She was brought to the city for further investigation.

When seen by us in June, 1936, she was a pale, sallow-complexioned young woman, with some flushing of the cheeks. The temperature was 37.8° C. (100° F.) and the pulse rate 120 per minute. The systolic blood pressure was 108 millimetres of mercury and the diastolic pressure was 80 millimetres. No bruit was audible over the precordium. A few scattered rales could be heard at the base of each lung. Tenderness was present on palpation in the left hypochondrium and the left lumbar region, and a large solid swelling could be felt below the left costal margin. The blood picture was one of hypochromic anemia: the haemoglobin value was 54%, the erythrocytes numbered 3,200,000 per cubic millimetre, the leucocytes numbered 14,000 per cubic millimetre, the colour index was 0.8. The urine was cloudy and contained erythrocytes, pus cells and colon bacilli. A Wassermann test of the blood gave no reaction. X ray examination revealed no thoracic abnormality, except raising of the left cupola of the diaphragm; a large opaque shadow under the diaphragm was attributed to enlargement of the spleen or of the left lobe of the liver.

For a month irregular pyrexia continued and the abdominal mass became larger and somewhat tender. Several attempts at blood cultures were made and gave negative results. A clinical diagnosis of suppurating hydatid cyst was suggested. The Casoni skin test gave an indefinite result, and the complement fixation test yielded no reaction. At our request Dr. Alan Hobbs performed abdominal section. He found the mass to consist of a greatly enlarged and rather soft spleen. No other abnormality was noted at the operation.

Subsequently, further blood samples were investigated, and on July 17 a culture of *Streptococcus viridans* was obtained. This was the only positive bacteriological finding in the many examinations made during the course of the illness. The infrequency of positive blood cultures is recognized as a common circumstance in the disease.

During the succeeding months the patient's condition became steadily worse. A systolic bruit was audible at the cardiac apex in July, 1936. Tachycardia persisted, the rate rarely falling below 100 per minute. The evening temperature varied from 37.8° to 39.5° C. (100° to 103° F.) for more than six months. The spleen became still larger, reaching below the costal margin to a breadth of five fingers. Attacks of pain over the splenic area became more frequent and more severe. On several occasions expectoration of blood-stained sputum occurred, and a pleural friction rub was audible over the lower lobe of the left lung. There was occasional slight hematuria. In spite of liberal administration of iron preparations, the hypochromic anemia persisted (see Figure I).

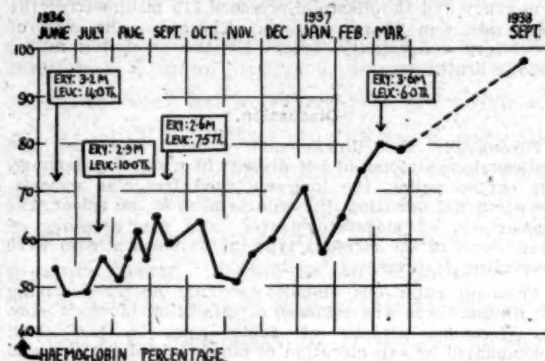


FIGURE I.

This illustrates the degree and variation of the anemic state associated with the long-continued toxemia. The steady rise in the haemoglobin percentage, beginning in January, 1937, has culminated in a normal blood state, which has been maintained.

During the later months of 1936 cardiac failure of the congestive type supervened. There was extensive serous effusion into each pleural sac, the liver became enlarged, the neck veins were engorged and there was moderate oedema of the legs. We had resigned ourselves to a hopeless prognosis.

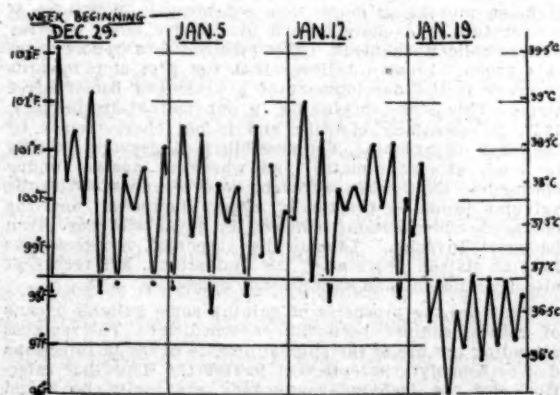


FIGURE II.

A portion of the temperature chart is reproduced. The irregular pyrexia shown as occurring from December 29, 1936, to January 19, 1937, is a fair sample of the chart from June, 1936, to December. The rapid fall on January 19 and 20 is illustrated. As far as is known, there has been no recurrence of pyrexia in the succeeding two years.

In the third week of January, 1937, a dramatic change took place. Almost in the manner of a crisis, the pyrexia subsided. Figure II illustrates this. The circulation

gradually recovered its efficiency, and the manifestations of congestive failure melted away. By March, 1937, the spleen had become palpable, the hæmoglobin percentage had risen to 80, and the patient was well enough to return to her home in the country. She soon resumed light housework, and has continued to manifest improvement.

She has reported back for review every three or four months. On the last occasion, in September, 1938, she said she felt well. She was doing her own housework, rising daily at 7 a.m. and retiring at 9 p.m. She had gained considerable weight, having increased from 48 kilograms (7 stone 8 pounds) to 73 kilograms (11 stone 7 pounds) in eighteen months. The hæmoglobin value was 97%; the systolic blood pressure was 160 millimetres of mercury and the diastolic pressure 115 millimetres; the pulse rate was 78 per minute. There was no sign of circulatory abnormality, except for the persisting mitral systolic bruit.

Discussion.

Throughout the illness our patient presented the septicæmic symptoms of the disease in a striking manner. The earthy pallor, the long-continued irregular pyrexia, the nocturnal sweating, the enlargement of the spleen, the leucocytosis of moderate degree, and the presence of streptococci of the *viridans* type in the blood stream were convincing features.

Although cutaneous emboli were not observed during the illness, there was evidence of infarction in other sites. The frequent attacks of acute pain in the chest accompanied by expectoration of blood-stained sputum, and the transient attacks of hæmaturia were noteworthy. Possibly some infarction of the spleen occurred at times, but it is more likely that the pain in that area was due to the general splenic enlargement of toxæmic origin and to peri-splenitis.

Beyond general nursing care and a full diet, no special treatment measures were adopted. As Lewis says, it is "a progressive disease, ending fatally with so few exceptions that little or no hope of the patient surviving is to be entertained. . . . It injures these patients to ply them with remedies".

Libman, in his grouping of the cases of *endocarditis lenta*, describes the "usual type" as running a course of eighteen months or more, with considerable elevations of temperature, and characterized by positive blood cultures and embolic phenomena. The case we now report is of this group. Libman believes that the first step towards recovery is the development of a prolonged bacteria-free stage. This stage, beginning in our patient in January, 1937, is essentially afebrile, and is not characterized by the signs of toxæmia. The possibility of, perhaps liability to, fresh attacks remains, and warns us against undue optimism. Even when apparent recovery does occur, the valvular lesion is practically always increased, and the damaged endocardium remains an ideal site for fresh bacterial invasion. Libman has reported recoveries as long as sixteen years after the first attack, but recurrent attacks constitute an ever-present danger.

What are the prospects of gaining some suitable means of attack against bacterial endocarditis? The success attending the use of the sulphanilamide drugs in infections due to hæmolytic streptococci fosters the hope that infections by the *viridans* group may eventually be found susceptible to some similar "artillery". The fact that, in subacute bacterial endocarditis, the organisms are buried in the avascular thrombotic vegetations is a difficulty, for in this way the organisms lead a sheltered existence, protected alike from circulating antibodies and from potent drugs.

Existing medical knowledge makes it possible to control the disease, not by any specific treatment, but by preventing or by treating early and efficiently those conditions which are its most important predisposing factors, and the greatest of these is acute rheumatism.

Reviews.

SURGERY FOR EVERY DAY.

The authorship of "Everyday Surgery" and its approval by Grey Turner are themselves a strong recommendation.¹ The authors admit dogmatism and expression of their own views from their personal experience, and this will immediately commend the work to all readers.

The book is in our opinion more valuable to the graduate—ancient and modern—than to the medical student, though all can gather much valuable help from its pages.

The introduction by Grey Turner is full of common sense and valuable advice. He is wise when he tells us to bear in mind that "unaccustomed symptoms in connection with long-standing disease are suggestive of the development of a new lesion" and also when in an epilogue to his introductory remarks he suggests that the book should be looked upon as expounding broad principles, as a guide in an emergency, and not as a text-book.

The English is simple and all the information is short and much to the point.

The diagrams are excellent and self explanatory. Diagram 89 on page 164 is a good sample, showing as it does where secondary spread and deposits in cancer of the breast should be expected when once the growth is beyond the confines of the breast.

It is refreshing to find recognized surgical teachers with a simple classification of goitre, a classification that can be understood, instead of one described in complicated jargon so often found today, of which the authors themselves are probably somewhat hazy.

The chapter on abdominal catastrophes covers a wide field. We think it wise to drain the peritoneal cavity through the loin after rupture of gastric or duodenal ulcers if there has been food contamination, and through the iliac region if the pelvis has been filled. Many will disagree with the suggestion of fixing the caecum in intussusception. Hipsley's method of treating intussusception is not mentioned; and as an aid to diagnosis the use of the bowel "wash out" might have been noted.

One of the best chapters deals with genito-urinary diseases, though the opening of the abdomen when operation is contemplated for ruptured kidney carries with it a grave risk, as already infection may have supervened.

Perhaps the weakest chapter concerns the chest.

Summing up, we should say that the book is sound and is recommended for what the authors claim it to be.

A DOCTOR IN THE BACKBLOCKS.

"NOTES FROM A BACKBLOCK HOSPITAL", by G. M. Smith, medical superintendent of Hokiang Hospital, New Zealand, covers a variety of subjects, ranging from a discussion of the education of the Maori to suggestions regarding hospital technique in operative surgery.²

The author, as he modestly says, is "only a doctor, not a politician, a banker, or economist", yet in the sixteen chapters of this little book will be found much to give food for thought. The sections on "The Essentials of a National Medical Service for New Zealand" and "A National Health Service for the Four Northern Counties", illustrated by very clear diagrams, are of particular interest at the present time.

The book is entertainingly written and should be of interest to both medical and non-medical readers.

¹ "Everyday Surgery", by L. Rogers, M.Sc., F.R.C.S., F.R.C.S.E., F.R.A.C.S., F.A.C.S., and A. L. d'Abreu, M.B., Ch.M., F.R.C.S., with an introduction by G. Grey Turner, D.Ch., M.S., F.R.C.S., F.R.A.C.S., F.A.C.S.; 1938. London: Edward Arnold and Company. Demy 8vo, pp. 292, with illustrations. Price: 12s. 6d. net.

² "Notes from a Backblock Hospital", by G. M. Smith; 1938. Christchurch: The Caxton Press. Demy 8vo, pp. 208. Price: 7s. 6d. net.

The Medical Journal of Australia

SATURDAY, MARCH 11, 1939.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

PROGNOSIS.

WERE all men built to a stock pattern so that they responded to physical agents or bacterial infections in regular fashion according to their peculiar constitution, the practice of medicine would be a simple business. Provided the strength of the physical agent could be measured and the virulence of the bacterium determined, it would be possible to foretell the outcome of any infection or physical disorder in man; it would also be possible to foretell the state of the man after he had recovered from his indisposition. And this apart from the ease with which treatment could be given. All men, however, are like contrary women of whom the comedian sang: "You never see two alike any one time and you never see one alike twice." Not only are all men different from one another, but each person changes from day to day and from hour to hour; man is ruled by many things and perhaps by his emotions most of all. Small wonder is it that

the medical practitioner finds the art of prognosis one of the most difficult that he has to practise.

The word prognosis, from the Greek *πρόγνωση*, means to know beforehand. It implies not a guess, a shot in the dark, but an opinion founded on knowledge and experience. Diagnosis and ability to pursue treatment follow on a sound theoretical knowledge of disease and on clinical training. If to these are added a retentive memory, an analytical mind and psychological insight, prognosis becomes possible. Without prognosis, diagnosis and treatment represent but a fragment of the physician's art. Even if a medical practitioner is not called upon to state his views on the future of the patient, his study of the patient's illness will not be complete unless he has formed an opinion of the patient's future—whether he will recover from his illness, whether he will be permanently affected by it, and, if so, what disability he is likely to suffer when he tries to take his place in society. It may be said that these are trite statements. Perhaps they are; but our object in making them is to call attention to an address given before the Pupils' Society at Guy's Hospital, London, by Dr. John A. Ryle, Regius Professor of Physic in the University of Cambridge.¹ Professor Ryle defines prognosis as rational forecasting based on pathology and observational experience. He discusses it as a duty—"a normal and proper physicianly function"—and as a discipline. If we look at prognosis from these points of view, we shall perhaps reshuffle our ideas and advance in the art of clinical medicine. Ryle points out that patients want to know the diagnosis solely or chiefly as a guide to prognosis. Comfort and reassurance are, he adds, universally accepted as essential contributions to progress and even to recovery. Anxiety is the most prevalent of all the harmful emotions, and the best counter of anxiety is a good prognosis. Thus optimism becomes a duty; "pessimism is repeatedly proved unjustifiable by the event". The young graduate finds prognosis the most difficult part of his practice. He is fortunate if he learns early that it is seldom either wise or necessary to tell the patient that he

¹ *Guy's Hospital Gazette*, December 3, 1938.

fears a fatal outcome of his illness, if he learns that Nature is kind and that the human body has powers of recovery which surprise even the elder clinicians. Ryle thinks that to give no prognosis is almost as culpable as to give a bad one and is an evasion of responsibility. This may be true; possibly it is; but the inexperienced will learn that it is not always necessary to put a prognosis into so many words. Confidence and hope can sometimes be conveyed by the medical attendant's general bearing just as well and maybe better than by any words he may utter. When any doubt exists the patient should, as Ryle suggests, always be given the benefit of the doubt. It may, of course, be suggested that the policy of the reassuring prognosis is not compatible with intellectual honesty. In this regard we may well quote what Ryle has to say:

I believe it to be perfectly compatible, so long as we do not delude ourselves. As scientists we do not bow to the foolish and impossible request of the law to tell the whole truth and nothing but the truth. We discover as much of it as we can, but, remembering the limits of our precision, we should recognize that it would be as unjust, through fear of error, to withhold comment on the more favourable features of a case, however few they be, as it would be to withhold any other helpful measure of treatment. If or when the outlook becomes absolutely bad, then we must impart our view to the relatives. Before that it is no failure of duty or honesty of purpose—while the mind is taking counsel with itself—to give rather more hope than the moment's uncertainty would seem to justify.

Before everything else we must be kind. As far as imparting the truth to a patient is concerned, it must be stated that no medical attendant is justified in withholding from a patient the truth as he (the medical attendant) sees it if the patient, in full possession of his faculties, asks to be told frankly all that has been discovered about his illness.

Ryle's second conception of prognosis as a discipline does not need much elaboration. Prognosis, as he states, requires a working knowledge of morbid anatomy, physiology and psychology; it requires also a knowledge of the general behaviour of disease and of the results of certain types of treatment. In short, prognosis is born of pathology out of clinical experience. Obviously anything which will enlarge clinical experience will increase

prognostic ability. The mind trained to receive clinical impressions may be trained to store them, and to store them, like the books in a well-indexed library, to be available on demand.

Current Comment.

RADIUM BEAM THERAPY.

THE Medical Research Council of the Privy Council has issued a report on radium beam therapy research undertaken during the years 1934 to 1938.¹ Radium beam therapy is also known as teleradium therapy or radium bomb therapy. The radium rays emanate from a large mass of radium situated at a distance from the patient; in radium therapy as commonly used the radium is applied in containers directly to the skin, or else suitable containers, needles, are inserted into the tissues by surgical operation. In 1933 radium beam therapy was undertaken in Great Britain and was carried out by direction of a governing body. This body was appointed by the Medical Research Council and the Department of Scientific and Industrial Research on the nomination of various scientific bodies and institutions. The personnel when the report was issued was as follows: Sir William H. Bragg (chairman), Lord Dawson of Penn, Sir Cuthbert S. Wallace, Sir Edward Mellanby, Professor James Young, Sir George Blacker, Sir Holburt Waring, Professor A. S. Eve, with Professor G. E. Gask as secretary and Mr. Geoffrey Pearce as treasurer. The original body suffered by loss of two distinguished members in the persons of Sir John McLennan and Lord Rutherford. The treatment of patients dealt with in the present report was entrusted to Dr. Constance Wood as radium therapist; she had the assistance of Mr. T. A. Green. The physics side was in the care of Mr. L. G. Grimmett.

The research was limited to cancer of the mouth, pharynx and larynx. This choice was made because growths in these sites are accessible to direct examination, because adequate surgery is often difficult and mutilating, and because an adequate supply of patients was available. Perhaps the most important point about the investigation was the close daily cooperation that was kept up throughout the whole of the work between clinicians and physicist. To this the success achieved is largely attributed. The greatest possible precautions were taken to avoid undesirable constitutional effects due to radiation on both workers and patients. Stringent rules were drawn up and careful records were taken, so that undue dosage was detected at once. Each member

¹ "Medical Research Council of the Privy Council. Special Report Series Number 221: Report on Radium Beam Therapy Research, 1934-38," by C. A. P. Wood, L. G. Grimmett, T. A. Green et alii; 1938. London: His Majesty's Stationery Office. Medium 8vo, pp. 78, with illustrations and coloured plates. Price: 4s. net.

of the nursing staff, for example, carried a condenser which would record the amount of radiation received each day. In no single instance was damage caused by radiation to a nurse or to a member of the technical or research staff. The blood of both patients and staff was examined at regular intervals.

The arrangement of the apparatus was ingeniously planned. While the patient was being set up for treatment the radium was kept in a safe until all the necessary preparations for treatment were completed; a pneumatic transference apparatus was used to bring the radium from the place of storage to the unit, and tongs were used to place it in position. There was thus no handling of the radium and the staff was not exposed to radiation. Periscopic mirrors were placed between the observation and treatment rooms, so that nurses were able to keep the patients under continual observation while they were being treated, and the time during which nurses were compelled to be in the treatment room was reduced to a minimum. The technique used was based on that of Berven, of Stockholm. As the research proceeded four main difficulties were encountered. In the first place there was no standard unit of dosage; secondly, there was an inability to direct the radiation accurately; thirdly, there was an inability to estimate accurately the radiation received in the tissues at the site of the disease; fourthly, there was an inability to estimate accurately the total radiation received by the body. In other words, the difficulties were those usually associated with radiation therapy. In this short summary of the report there is no need to traverse the steps taken to overcome these difficulties. It will suffice to point out that the methods devised to overcome them were the result of collaboration between the radiation therapist and the physicist. To this reference has already been made.

Before treatment was undertaken attention was paid to the general condition of the patient. An effort was made to control nutrition; in difficult cases the Calorie intake was controlled and care was taken that the diet had a high vitamin content. An attempt was made to eliminate local sepsis.

Ports of entry were chosen so that radiation would include both the primary growth and the cervical glands. The methods by which this was done are well set out in the report by diagrams of application in typical cases. It was found that the best results were obtained when approximately 7,000 r were delivered to the lesion in forty-two days. Two treatments were given every day, and an interval of some hours was allowed between each treatment. In most cases the course of treatment lasted six weeks. During the first two and a half years of the research the radium was filtered through three millimetres of platinum equivalent; during the last eighteen months the filter was reduced to 1.8 millimetres of platinum equivalent. No biological difference was detectable between the two filtrations; the reduction of the filter proved to be an economical advantage in view of the increased radiation intensity accompanying it.

As already stated, the research was limited to cases of cancer of the mouth, pharynx and larynx. Growths in all stages of advancement were treated, but no patient was accepted for treatment if previous treatment, either radiological or surgical, had been given. No patient was accepted for treatment if distant metastases were known to be present. Altogether 366 patients were treated during the four years and not one remained untraced.

Of the 366 patients, 34 had conditions which were considered operable. We do not propose to give details of the results obtained in the thirteen groups of patients classified according to the situation of their growths. One or two examples will indicate the type of result obtained. Of 26 patients with carcinoma of the anterior two-thirds of the tongue, seven were considered suitable for operation; of these, five were "symptom-free" when the report was issued. Of 19 whose growths were inoperable, three were symptom-free. Several patients died of intercurrent disease while they were symptom-free; if these are included, 13 of the 26 were symptom-free. Of 24 patients with carcinoma of the floor of the mouth, four were considered suitable for operation. All four were symptom-free when the report was issued. Of 20 whose growths were inoperable, five were symptom-free. If patients who were symptom-free and died of intercurrent disease are included, 15 were symptom-free.

The general conclusions as to the value of treatment are as follows:

1. In cases in which the growth is early and localized, its complete disappearance can be expected.
2. Where there is secondary involvement of the lymphatic glands in close proximity to the primary growth, the enlargement of the glands can also be made to disappear.
3. When both the primary growth and glands are in an advanced and inoperable stage, in a small proportion of the patients the disease can be made to disappear, and in a large proportion distressing symptoms may be relieved.
4. When distant metastases have already developed, their growth will be progressive and inevitable, even though in the region treated the disease has been destroyed.
5. Though it is too early to make definite pronouncements, it would appear that treatment of carcinoma of the mouth and throat by radium beam is at least as satisfactory as that provided by surgery or by interstitial radium therapy. It has further this great advantage, that the results are obtained without mutilation of the patient.

This is not a very enthusiastic statement of results. Obviously the caution is justified. There is no evidence that treatment by a radium bomb is superior to treatment by deep X ray therapy. It may be that skin tolerance is greater with radium. The research committee evidently still has an open mind, for plans have been made for the duplication of this work with X ray therapy. It must also be remembered that a radium bomb is enormously expensive and that some of the conditions treated by it can be treated by radium used in tubes placed in the tissues, and at much less cost. In Paris and Stockholm, where radium bomb therapy is available, a great deal of deep X ray therapy and of what is known as "interstitial radium" is used.

In the foregoing little reference has been made to the physics side of the report. Radiologists and others engaged in the actual treatment of patients by radium and X rays will find this of the greatest interest and importance. The careful attention to the details, many of which have not been mentioned in this review, alone makes it possible to obtain success with either radium bomb or deep X ray therapy.

THE VICTORIAN DEPARTMENT OF MENTAL HYGIENE.

THE Director of Mental Hygiene of Victoria, Dr. J. Catarinich, has issued his report for the year 1937. The report, which contains many tables dealing with the statistical side of the department's activities, is an interesting document and merits the attention of all practitioners, particularly those in general practice in Victoria.

At the end of the year under review there were 6,060 patients resident in Victorian mental hospitals; this represented a decrease of 67 from the previous year. The number of patients on trial leave had risen from 814 to 920, whilst the number of "boarded-out" patients increased by 49. This means that the number of patients under the control of the department had risen by 88. In his letter of presentation to the Chief Secretary Dr. Catarinich draws attention to the increasing use of mental hospitals by patients who recognize their own disabilities and come to the department voluntarily without certification. This has been noted in other States of the Commonwealth, and is one of the most satisfactory features of modern mental hospital work.

The treatment of patients suffering from *dementia præcox* with insulin and "Cardiazol" has been commenced, and encouraging results have been obtained. An account of some of this work will be found in THE MEDICAL JOURNAL OF AUSTRALIA of January 15, 1938, in an article by Dr. C. Farran-Ridge and Dr. P. Guy Reynolds. Dr. Catarinich points out that though the permanence of the results with this treatment cannot be determined, a great advance has been made in the treatment of *dementia præcox*. During the five-year period 1932 to 1937 the number of patients resident in Victorian mental hospitals who were suffering from *dementia præcox* was increased by 142. A large proportion of those who are incurably insane suffer from this disease, and any treatment giving satisfactory results is likely in the end to reduce the number of patients retained indefinitely in mental hospitals.

Dr. Catarinich states that the ratio of certified insane in the community is now 1 in 255. He thinks that unless the proportion of young people in the community is increased by a rising birth rate, it seems likely that this ratio will go on increasing, as

insanity is mainly a disease of middle and advanced age. "Birth prevention is a crime against the State and one which has many unforeseen and disastrous consequences."

During the year 835 patients were admitted into mental hospitals; of these, 55 had had one or more previous attacks. The average age of patients on their admission was 45.97 years. Of the 835 patients, 141 suffered from mental disability which was the result of deterioration associated with old age. Venereal disease accounted for 33 admissions, but this figure does not indicate the actual relationship between venereal disease and insanity, as a number of patients so affected are treated under the voluntary border clauses. Alcohol was the main determining factor in 41 cases. It is, however, difficult to assess the degree to which alcohol is responsible for mental illness, because, as Dr. Catarinich points out, over-indulgence in alcohol is sometimes the first evidence of mental instability and not its cause.

The number of patients discharged from mental hospitals was 358, and of these, 233 apparently made a good recovery from their illness. Six patients suffering from general paralysis of the insane recovered under malarial treatment. The opinion is expressed that more general paralytics would recover if they were put under treatment in an early stage of their illness. At the present time when the patients are admitted permanent damage of the brain has already occurred, and prevention of further damage is all that can be expected. This is a point which should be remembered by the general practitioner, on whom the duty of the recognition of the disease in the early stages will usually fall. During the year 45 general paralytics were treated with malaria. In addition to the six who were cured, six others manifested so much improvement that they were allowed to go home, and 16 improved "but not sufficiently to allow of them resuming their places in the community".

The number of deaths during the twelve months was 377, the average age at death being 62.7 years. *Post mortem* examinations were held in 253 cases. Apparently an order from a coroner is necessary before an autopsy can be held, for Dr. Catarinich refers to the reluctance of coroners to order an autopsy to be made. This is unfortunate, for autopsy should be carried out after all deaths in mental hospitals.

In May, 1937, the Director was sent to New Zealand to investigate the villa system of housing mental patients. This system represents an endeavour to make wards more like a home, with very little restriction of liberty. "It may be accepted that the modern trend in treatment is to increase as far as possible the liberty which can be given to patients." Dr. Catarinich points out that in the acute phases of mental illness it becomes necessary to restrict the liberty of the patient in a large proportion of cases. At the same time he thinks that the receiving wards in mental hospitals should not differ in any great degree from the accommoda-

tion provided in general hospitals. A new institution is to be erected at Kew at a cost of £40,000. In this building the hospital plan of building will be adopted for acute cases, and for "quiet, easily managed patients" open villas will be provided. On this decision both the Director and the Minister are to be congratulated.

The satisfaction that will be felt at the expenditure of £40,000 on a new mental hospital building is set off somewhat by Dr. Catarinich's remarks on the state of some of the old buildings. He describes a large proportion of the accommodation as unsuitable and open to severe criticism. Moreover, the number of artisans available is not sufficient to keep new construction in decent repair, and deterioration has occurred which might well have been prevented. Surely a government which has realized the necessity for the erection of a new hospital will have enough foresight to care for those which it has and to bring up to date those which are antiquated.

Dr. Catarinich concludes an interesting report by a plea for the improvement of the conditions of service of medical officers, that a suitable type of sympathetic officer may be obtained. He also is insistent that further facilities for research must be provided. Without research any mental hospitals department will be ineffective; the trouble is that governments which hold the purse strings do not always realize this.

HEPATITIS.

REFERENCE has been made from time to time in these pages to the nature of certain forms of hepatitis, such as one of the forms of acute catarrhal jaundice, and also to the attempts made in various clinics and laboratories to simplify the problem of estimating liver efficiency. Obviously liver function itself is a misnomer. Rather should we speak of liver functions, for it is necessary first to have a clear idea which of the various divisions of activity of the liver we wish to investigate before we carry out a test of any kind. But clinicians for a long time have felt that certain aspects of hepatic efficiency are worth closer study. What is the end result of an attack of acute catarrhal jaundice on the liver? We know how ruinous may be the effect in some cases of a toxic drug like cinchophen; we also know how hepatic necrosis may result from other and more cryptic causes, and we therefore have reason to believe that attacks of hepatitis of lesser intensity may be not uncommon, and that these may lead to unpleasant sequelae after the passage of time. Again, we have had our attention directed to the importance of the glycogenic functions of the liver in studies of diabetes and of von Gierke's disease, of which latter accounts have been published by Australian observers.

J. W. Conn, L. H. Newburgh, M. W. Johnston and J. M. Sheldon have published an account of their

studies of a series of cases of infectious hepatitis of various types.¹ The actual presenting symptoms of their patients were diverse: in four cases attacks of loss of consciousness, later found to be due to hypoglycæmia, were the leading feature; in one attacks of staggering and weakness were pronounced; and in another jaundice was associated with gall-bladder disease. In all these cases investigation proved that hypoglycæmia occurred at intervals, that is, symptoms were observed characteristic of and associated with spontaneous hypoglycæmia. Metabolic experiments proved that dextrose was normally oxidized under all conditions in these subjects, although a hyperglycæmic response was observed after ingestion of dextrose. The authors summarize their views as to the mechanism of the symptoms as follows. The excess dextrose found in the blood stream was, they think, due to an impairment of the glycogenetic function of the liver, which was slowed down in its rate. Thus a postprandial hyperglycæmia was possible, accompanied by glycosuria; but this was only one phase of disturbed liver function. Another phase of hepatic disturbance was seen in the same patients at times, namely hypoglycæmia, possibly associated with further hepatic injury. This was not due to hyperinsulinism, since no evidence of over-oxidation of dextrose was obtained. The authors point out also that in cases of spontaneous hypoglycæmia in which operation is performed, a tumour of pancreatic islet tissue is not always found. Low blood sugar levels in these patients could be obtained by restriction of carbohydrates in the diet, and it is pointed out that the behaviour of the liver under such conditions of restriction is a test of its ability to deal with carbohydrate in a normal fashion. The clinical and chemical evidence produced in this study is also reinforced by the histological examination of liver tissue obtained by biopsy or autopsy. The authors feel warranted in stating that there is a definite syndrome which is characterized by the presence of low blood sugar values during fasting, periodic attacks of spontaneous hypoglycæmia and postprandial hyperglycæmia and glycosuria. The lesion which they constantly associate with this is a chronic ascending infectious hepatitis, and when the cause of the hepatitis can be found and removed clinical cure may be expected.

This work emphasizes that even greater care should be taken in the diagnosis of *diabetes mellitus*, and further, that when a history of attacks of faintness or loss of consciousness is given, the observation of a normal or even a raised value of the blood sugar after a meal or the ingestion of carbohydrate does not preclude the possibility that such attacks may be due to hypoglycæmia. In the latter case, however, it would be unsafe to assume that they would necessarily be due to hypersecretion of insulin.

¹ *Archives of Internal Medicine*, November, 1938.

Abstracts from Current Medical Literature.

MEDICINE.

Typhus Immunization.

THE control of typhus presents serious difficulties because of the problem of the cultivation of the organism *in vitro*. At the same time all attempts at immunization with killed infected tissue have resulted in failure. I. J. Kligler and Sonia Levine (*Transactions of the Royal Society of Tropical Medicine and Hygiene*, June, 1938) describe experiments on the use of formalized tissue cultures of typhus *Rickettsia* as vaccine. It appears that cultures so treated constitute an effective immunizing vaccine. Both vaccinated monkeys and human beings react to the Weil-Felix test. Monkeys given two cubic centimetres of the vaccine in three injections of 0.5 cubic centimetre, 0.5 cubic centimetre and 1.0 cubic centimetre at intervals of three days were rendered immune to a large infective dose of the virus given two weeks after the last dose of vaccine. The duration of the immunity has not yet been determined.

Angina Pectoris and Coronary Artery Disease.

S. A. LEVINE (*New England Journal of Medicine*, November 10, 1938) tries to clear up some of the confusion that exists in relation to *angina pectoris* and coronary artery disease. He considers that *angina pectoris* is a useful term which may still be very profitably used to designate a certain clinical condition that can be readily recognized. The main difficulty is that the diagnosis depends on the symptoms alone; there are no objective signs or tests, except in so far as the original symptoms may be reproduced by some procedure that the physician performs. Evidence of organic disease of the heart may or may not be elicited, but even if present it merely incriminates the heart as a diseased organ and fails to establish the diagnosis of *angina*. The symptoms make the diagnosis; there is nothing more important in the practice of internal medicine than to ask every patient whether he has any sort of distress in the chest while hurrying or walking up hill, especially in the cold weather or after a meal. The symptoms may be very mild and quite insignificant to the patient; but there is no relation between the mildness of the symptoms and the gravity of the condition. It is now believed that *angina* has a uniform physiological cause, myocardial anoxemia, and is accompanied by only a few related pathological conditions. Severe anemia, paroxysmal tachycardia and hyperthyroidism may rarely be responsible for anginal distress; even

here, however, the coronary artery may be sclerosed. Aortic valve disease, particularly the stenotic form, occasionally accompanies *angina*. Apart from these conditions, *angina pectoris* is always due to sclerosis of the coronary arteries. The terms *angina pectoris* and coronary sclerosis are not synonymous, for while the former is almost always due to the latter, coronary sclerosis is not always associated with *angina*; it is suggested that in these instances, although the main branches of the artery are sclerosed, the blood supply to the myocardium through the finer branches may still be adequate. It is important to recognize the condition, for the overwhelming majority of cardiac patients do not die suddenly unless they have *angina* or sclerosis of the coronary arteries. The functional tests applied will usually provoke an attack after a certain amount of work has been done, and this amount may be constant for each patient. This examination excludes neurogenic influences and reflexes which are responsible for exciting an attack under varying conditions of work. The character and development and duration of the attack may vary under different conditions. There are trigger mechanisms which cannot be measured in foot-pounds of work, but which must be evaluated for the purposes of treatment.

Peptic Ulcer of the Oesophagus.

D. T. CHAMBERLAIN (*American Journal of Digestive Diseases*, January, 1939) has made a study of seven cases of peptic ulcer of the oesophagus and a review of the pertinent literature to clarify the diagnosis, in order to offer certain diagnostic criteria and to point out an important etiological factor which seems to have been overlooked. The characteristic symptomatology is dysphagia, sub-xiphoid distress occurring one to two hours after meals and relieved by food or soda. Hemorrhage and occasionally perforation may occur. The diagnostic criteria suggested are: (a) the ulcer must be unassociated with systemic disease, (b) the ulcer must be seen at oesophagoscopy or autopsy, (c) free gastric hydrochloric acid must be present, (d) the ulcer must be chronic, (e) the symptoms must be relieved by peptic ulcer therapy and dilatation. The two essential etiological factors hitherto recognized are aberrant gastric mucosa in the lower third of the oesophagus and the regurgitation of gastric hydrochloric acid through a patent cardia. It is not necessary for both these factors to be present in any one case. There are no suggestions why the cardia should be patent. In the seven cases reported here, in six either a short oesophagus or a diaphragmatic hernia or both were present; this was determined by radiographic examination. In the course of gastro-enterological practice many small asymptomatic diaphragmatic hernia

are seen, and occasionally a patient with pain, vomiting or hemorrhage has a diaphragmatic hernia which is discernible only by the radiograph. Oesophagoscopy in these cases would reveal peptic ulcer, and this condition of the oesophagus would be found not to be so rare as the literature indicates. It is unlikely that a short oesophagus is due to the scar tissue resulting from the ulcer lesion, since it is present with diaphragmatic hernia as a predisposing factor.

Lung Abscess and Cardiospasm.

D. A. SIMPSON (*New England Journal of Medicine*, December 22, 1938) reports the history of a man admitted to hospital for investigation of a chronic pulmonary inflammatory lesion. It was found that he had a lung abscess of unknown aetiology. Hospitalization and treatment were successful, and for six years the patient remained well. After this period he again reported with symptoms referable to his stomach; investigation proved that he was suffering from cardiospasm. The history was then volunteered that that diagnosis had been made seventeen years previously. The author contends that it seems justifiable to conclude that overflow of the obviously infected and retained oesophageal contents (probably during sleep) had been the cause of the pulmonary suppuration. Cardiospasm is not generally recognized as a cause of lung abscess; this may be due to its apparent infrequency. Idiopathic lung abscess may have such a basis. There are many reported cases of pulmonary complications following oesophageal stricture, benign or malignant. It is recommended, therefore, that the oesophagus should be examined as a routine in all cases of unexplained lung abscess, in spite of absence of symptoms. It is also pointed out that delay in dealing with a severe grade of oesophageal obstruction and retention may be serious from the point of view of pulmonary complications.

Supersensitiveness.

F. A. SIMON (*Annals of Internal Medicine*, August, 1938) classifies the several types of supersensitiveness. The first type is characterized by the fact that in a given animal species all individuals adequately exposed to a suitable allergen become sensitized, and supersensitiveness may therefore be reproduced at will. This type comprises: (a) the supersensitiveness following infections such as tuberculosis and trichophytosis; (b) anaphylactic supersensitiveness, which follows the parenteral injection of foreign substances, such as foreign blood serum; (c) contact eczema of the type that can be produced at will. The second type has been observed only in man, and is characterized by the fact that only a small proportion of exposed individuals become sensitized, even though the exposure is

great and repeated. Disorders caused by this type of hypersensitivity cannot be reproduced at will, because the physiological conditions necessary for their establishment are unknown. To this second variety belong: (a) atopic supersensitiveness, manifested by hay fever, asthma and atopic eczema; (b) a closely related condition following the injection of insulin, horse serum, milk and the like; (c) contact eczema from such substances as nickel compounds, dyes and formaldehyde. The author describes experiments designed to throw light on the question of whether atopy is a conditioned anaphylaxis, but no relation between the two conditions was demonstrated. He believes that the influence of heredity in atopy should be regarded as a challenge to elucidate its physiological mode of action, and suggests methods of further investigation.

The Treatment of Tuberculous Cavities by Intrapulmonary Injections.

R. A. HUNTER AND E. J. PEILL (*The British Journal of Tuberculosis*, July 1938) have injected a compound solution of gelatin, acriflavine and calcium chloride into the pulmonary cavities of patients suffering from tuberculosis with apparently beneficial effects. Intrapulmonary injections were first made into rabbits, both healthy and tuberculous. No ill effects were observed, and "hydatid change", calcification and fibrosis, as seen *post mortem*, were produced. The authors have since given 180 injections to human subjects, with no catastrophe and only minor reactions. Usually three or four injections of sixteen cubic centimetres per dose are given at weekly intervals. Details are given of the preparation of the solution and of the technique of the injections, together with the case notes of three patients whose cavities were apparently obliterated after this treatment. The authors refer to the dictum of Coryllos, that tuberculous cavities represent the most important feature of pulmonary tuberculosis. They are not a mere complication, but are the disease itself. They point out that collapse therapy in its various forms has many limitations and cannot be employed in the majority of cases. They conclude that intrapulmonary injection is a safe and rational procedure in the treatment of pulmonary tuberculosis.

Benzedrine Sulphate.

D. H. ROSENBERG, R. A. ARENS, P. MARCUS AND H. NECHELES (*The Journal of the American Medical Association*, June 11, 1938) discuss the use of benzedrine in the treatment of spastic colon. Eighteen patients were investigated radiologically. Spastic colon was noted. The patients were treated with benzedrine sulphate, five to ten milligrammes being given orally two or three times a day. In three

patients the condition was ameliorated, in eleven there was no improvement, and three were made worse. Numerous symptoms of toxicity were recorded: exhilaration, insomnia, dry mouth, weakness, faintness, headache, tremor, palpitation, tachycardia and rashes. The authors conclude that benzedrine sulphate is not to be recommended for spastic disorders of the gastrointestinal tract.

Treatment of Persistent Hiccup.

M. S. SHAINÉ (*The American Journal of the Medical Sciences*, November, 1938) found that 10 or 20 milligrammes of benzedrine sulphate, orally administered, quickly relieved distressing hiccup in three patients after other treatment had failed to do so.

The Reticulocyte Response in Pernicious Anæmia.

R. ISAACS AND A. FRIEDMAN (*The American Journal of the Medical Sciences*, November, 1938) state that there exists between the maximum reticulocyte response to intramuscular liver therapy in pernicious anæmia and the initial erythrocyte count a relationship expressed by the formula

$$R = \frac{82 - 22E}{1 + 0.5E}$$

where R stands for the maximum percentage of reticulocytes reached during the reticulocyte response, and E stands for the number of millions of erythrocytes per cubic millimetre of blood at the beginning of treatment.

Reticulocytosis.

E. SCHIGDT (*The American Journal of the Medical Sciences*, November, 1938) found after hemorrhage a correlation between the height of reticulocytosis and the lowest erythrocyte level; but in individual cases the degree of reticulocytosis did not give any indication as to the rate of blood regeneration. Reticulocytosis in patients given iron did not greatly exceed that in patients not so treated. Reticulocytosis represents intensity of emission of new corpuscles into the circulation, and accompanies intensity of production of new corpuscles, but production and emission do not run parallel and are presumably controlled by different factors: for instance, reticulocytosis may occur without increased intensity of production, as in pernicious anæmia treated with arsenic.

Tropical Phagedenic Ulcer in the Pacific.

CLIFFORD S. JAMES (*Transactions of the Royal Society of Tropical Medicine and Hygiene*, April, 1938) discusses 892 cases of ulcer from his practice in Choiseul and Malaita, in the Solomon Islands and in New Britain. Phagedenic ulcer is due to an infection of fusiform bacilli, spirochaetes and filamentous organisms,

and a correlation was found between the clinical state of the ulcer and the organism found in the smears. All ulcers in the phagedenic state yielded fusiform bacilli. In New Britain ulcers and their complications were the chief cause of death in hospital, and urgent amputations and blood transfusions were often necessary. Among patients from the Solomon Islands only one death occurred. Malignant disease supervened once in the author's series. The influence of dietetic insufficiency is shown to be an important predisposing cause, and the essential lack is suggested to be in protein. A relationship between malarial infection and phagedenic ulcer is suggested. Prophylaxis consists in the wearing of shoes and stockings and in the immediate application of iodine and adhesive plaster to any break in the skin; to this must be added a properly balanced diet and the avoidance of malaria. The first procedure in treatment is the application of a caustic to the ulcer. As much copper sulphate is ground up in glycerine as it will absorb, and to each ounce of the resulting solution is added one drachm of pure carbolic acid as an anæsthetic. This is applied daily to severe ulcers till the surface is hard and granular. If pain or swelling is present a small acriflavine dressing is applied and covered with a hot fomentation twice a day. When the ulcer is clean, and if it is small, scarlet red ointment and adhesive strapping or "Elastoplast" are applied for a week or more. Adhesive strapping should not be applied to active ulcers. Absence of phagedenic bacteria is proof of loss of activity. For larger ulcers the author recommends excision and immediate skin graft, and describes the methods used in his practice. Non-specific protein therapy has been found of assistance when the patient's vitality is doubtful, and is considered to help the growth of the skin grafts.

Œdema in Helminthic Anæmia.

M. SALAH (*Transactions of the Royal Society of Tropical Medicine and Hygiene*, January, 1938) subjected to clinical and biochemical examination and to treatment by various diets and other measures 22 patients with helminthic anæmia accompanied by œdema. He found that there was no constant relationship between the degree of œdema and the severity of anæmia. Some patients, whose hæmoglobin values ranged from 10% to 20% of normal, showed no œdema. Of the series investigated, the œdema in three cases was held to be due to circulatory factors, in three to the anæmic state, and in 12 to hypoproteinaemia. No evidence of a lack of vitamin B was found. It is held that the investigation indicates new lines of treatment, the replacement of deficiencies in blood constituents tending to cause not only disappearance of the œdema, but also blood regeneration.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at Ballarat on December 3, 1938. The first part of the meeting took the form of a series of clinical demonstrations by members of the staff of the Ballarat Base Hospital, followed by a discussion of the problems arising from the demonstrations. Dr. J. P. MAJOR, C.B.E., the President of the Victorian Branch, occupied the chair and was supported by Dr. N. A. LONGDEN, the President of the Ballarat Subdivision. The second part of the meeting will be reported in a subsequent issue.

Paroxysmal Hæmoglobinuria.

DR. G. T. JAMES showed a patient, J.M., thirty-eight years of age, who had been referred on November 20, 1938, for investigation of symptomless hæmaturia and who had become jaundiced on the following day without any accompanying pain. The liver was slightly enlarged and the tip of the spleen palpable. The urine, when examined microscopically, was found to contain many small granular casts, but no pus cells or red blood cells; some Gram-positive diplococci were seen in the smear. Dr. James stated that the patient had been admitted previously to the hospital on July 9, 1938, with acute suppurative appendicitis, and after appendicectomy without drainage had had an uneventful recovery. He also reported the details of the investigation of the blood during the recent illness of the patient. The red cells numbered 1,400,000 and the white cells 13,500 per cubic millimetre of blood; the hæmoglobin was estimated at 40%, giving a colour index of 1.4; and the reticulocytes were estimated at 20%. Some erythroblasts and numerous polychromatic macrocytes and definite anisocytosis were reported on examination of a blood film. The blood serum yielded a delayed direct Van den Bergh reaction and a weak positive response to the Fouchet test. It had been found that the red blood cells were of normal fragility.

DR. G. A. PENINGTON said that the condition of Dr. James's patient could be placed in the group of acute hæmolytic anemias with macrocytosis. Davidson, in *The Quarterly Journal of Medicine* some years earlier, had presented a variety of causes, ranging from Hodgkin's disease to acute lead poisoning. In the case under discussion no evidence had been found of an acute hæmolytic substance, although there had been a previous attack of jaundice. Dr. Penington expressed the opinion that the diagnosis was acute hæmolytic anemia rather than paroxysmal hæmoglobinuria, and that it was not likely to be due to syphilis. In the paroxysmal hæmoglobinuria group it was possible by exposure of the patient to extreme cold, as by immersion in very cold water, to produce at will the hæmoglobinuria. He added that the actual diagnosis of the exciting cause must be dependent on the finding of a definite infective or toxic process. Since the removal of the appendix the patient had not been in good health, but the response to rest in bed had been extremely rapid and he was likely to recover completely from the present attack. It would be advisable to keep him under observation for years and to examine blood films frequently, with special reference to the reticulocyte count. If he had a recurrence the transfusion of blood should be considered; but in that type of case it was of great importance that the donor should be selected by accurate cross-typing and that the blood should be given slowly, as there was an unusually great risk of reaction.

DR. STANLEY WILLIAMS, after concurring in the diagnosis of hæmolytic anemia, expressed the opinion that splenectomy might be advisable if the patient had a further attack.

DR. COLIN ROSS said that the symptoms could occur in childhood, though the condition was of comparative rarity in adult life. As it occurred in childhood, though often associated with a definite cause, it might be of unknown ætiology. If the condition in Dr. James's patient was the

same as that occurring more commonly in childhood, the prognosis was good in that, though there was a liability to further attacks, the attacks were likely to be of diminishing severity. Dr. Ross added that Dr. N. Hamilton Fairley had shown that if hæmolysis was relatively slow bile pigmentation resulted, but if it was faster there was not time for that process and hæmoglobinuria resulted. On that basis the series of conditions was a continuous one. Dr. Ross recommended that skiagraphy of the bones should be undertaken and might prove of considerable interest.

Dr. Penington spoke again to say that he had just been informed that the patient had had quinsy immediately before the present attack. When he had recovered sufficiently, tonsillectomy would be very germane to treatment.

Aneurysm of the Aorta.

DR. GEOFFREY PERN showed a married woman, aged thirty-six years, who had been a hard-working country girl all her life, without an illness except that she had undergone an appendicectomy about five years previously. She had married and proceeded to work harder and to produce, with monotonous regularity, seven healthy children, the youngest of whom was two and a half months old.

Up till the time when she had had the "turn" she had not had a pain or an ache and was working hard. On September 24, 1938, whilst eating her luncheon, she suddenly found herself unable to speak. Apart from a little giddiness and a slight headache she was quite conscious and able to move about. She managed to speak the name of one of her daughters. This partial aphonia had lasted about one and a half hours. When brought into hospital she had recovered her voice and felt fairly well. During the routine examination no abnormality was detected anywhere except in her heart. This was slightly enlarged and some dulness was found to the left of the upper end of the sternum. A thrill was felt all over the precordium, with a maximum intensity in the second left interspace near the sternum; a very loud harsh systolic murmur was heard all over the chest, up into the neck, out in the axilla, but again with maximum intensity in the second interspace.

On fluoroscopy of the chest some dilatation of the arch of the aorta was seen, with a large opaque shadow about the junction of the arch with the descending aorta, which seemed to be pulsating. The lateral oblique view showed a fairly expansile ascending aorta and arch pushing the œsophagus over to the right, which was confirmed by a barium meal. The skiagrams confirmed these findings and showed more clearly what appeared to be a large sacular aneurysm at the descending aorta, with some cardiac enlargement. The systolic blood pressure was 130 millimetres of mercury and the diastolic pressure 75 millimetres; the pressure was equal in both arms. A syphilitic origin would be first thought of. Seven normal labours, no signs in the central nervous system, and repeated negative response to the Wassermann test after provocative "Novarsenobillon" injections were against this. Arteriosclerosis was a possibility, but not a probability. A congenital origin had to be considered. Here was elicited the interesting fact that this was the first time that a stethoscope had been placed on the patient's chest, so they were unable to trace the patient back at all. Coarctation of the aorta with dilatation above would have to be thought of. Against this there were the facts that there was no rise of blood pressure in the arms, and the pressure in the legs appeared to be the same or higher than that of the arms, with good abdominal pulsation. A congenital abnormality of the heart could not be excluded. A patent ductus arteriosus would give the following signs, all of which the patient had: (a) a heart not greatly enlarged; (b) a thrill, systolic in time and of maximum intensity in the second left interspace; (c) Gerhardt's ribbon area of dulness running along the left border of the sternum; (d) a harsh systolic murmur with maximum intensity in the second left interspace; (e) comparative absence of symptoms.¹

¹The patient collapsed and died suddenly on January 12, 1939; no further information is available.

Dr. G. A. PENINGTON said that it was difficult to be dogmatic and that the question of the cardiac condition in itself was worthy of full discussion. The findings were those of gross cardiac enlargement with a palpable thrill, maximal to the left of the sternum, accompanied by a systolic bruit, also maximal to the left of the sternum. It was possible that the patient had a congenital abnormality and an association of cardiac and aortic anomalies. He advised radiography during the passage of barium in the oesophagus, in order to attempt to obtain additional information. As there was considerable dullness anteriorly in the first and second intercostal spaces, the dilatation might be involving the pulmonary artery; but there was no evidence of aortic regurgitation. He was always chary of diagnosing syphilitic aneurysm of the aorta in the absence of signs of aortic regurgitation. Dr. Penington observed that, as the patient had been able to utter her daughter's name just after the onset of the aphasia, which therefore could not have been absolutely sudden, and as the aphasia had also been temporary, it was probably not caused by a cerebral vascular lesion.

Removal of Multiple Large Diverticula of the Bladder.

Dr. RONALD DAVIDSON showed a married woman, fifty-eight years of age, who had come under his care on August 2, 1938. She was then quite unable to empty her bladder and was in great pain. He had slowly drawn off a pint of very foul urine. For a long time she had complained of dysuria associated with gradually increasing difficulty of micturition, and from infancy she had had a "weak bladder". The urine often dribbled away, and there was difficulty in holding the urine and in completely emptying the bladder. Symptoms of difficulty in commencement of the act of micturition had persisted with varying intensity for many years, and an attack of haematuria had occurred two years before the present trouble. She had been pregnant on six occasions; the first three pregnancies produced living children, the third child dying at the age of three months, but the remaining pregnancies were terminated on account of severe vomiting. In 1922 a vaginal hysterectomy had been performed and the patient had stated to Dr. Davidson that during her convalescence from the operation she had suffered greatly from abdominal distension.

After the patient's admission to hospital on August 4, 1938, general examination and careful investigation of the nervous system had failed to reveal any abnormality and the blood serum had not yielded the Wassermann reaction. The bladder was washed out frequently and it was observed that an ounce or more of frank pus escaped from the catheter after the urine was drawn off. The observations made as a result of cystoscopic examination on August 10 and August 15 were that, although the bladder was greatly dilated, there was practically no trabeculation of the bladder wall; intense basal cystitis and the presence of a number of openings into diverticula were conspicuous; on the intravenous injection of indigo-carmin the escape of the dye from both ureteric orifices was seen in slightly over six minutes. Further bladder washes had been given for a few days after the cystoscopic examinations and radiography of the bladder was carried out, over thirty ounces of 5% sodium iodide solution being injected. From antero-posterior and lateral skiagrams Dr. Davidson demonstrated the presence of multiple diverticula, one of them being very large.

Dr. Davidson remarked that at that stage there was no prospect of relief from the retention or infection unless the diverticula were removed it was presumed that the diverticula had a congenital origin, which had resulted in the production of retention from weakness of the detrusor mechanism, including the trigonal muscle. He had hoped that if that mechanism could be placed at a more favourable mechanical advantage normal micturition might ensue. On August 28 he had operated through a subumbilical mid-line incision after distending the bladder and diverticula with fluid; he had stripped the peritoneum off the bladder and off the large diverticulum until it became intimately adherent to the thin-walled sac. The peritoneal cavity

was then opened transversely across the upper surface of the diverticulum, and the peritoneum, where it was reflected from the postero-inferior surface of the same sac, was also incised transversely and the two edges of peritoneum were sutured together, the peritoneal cavity thus being closed. After the suture line had been packed off the bladder was emptied and opened to give more room in the pelvis and to aid the dissection of the large sac, which was eventually freed and excised. Two smaller diverticula were afterwards dissected out and excised, the left ureter being adherent to one of them. The holes in the bladder were closed with continuous catgut sutures, a rubber tube being passed down for drainage on the outside of the bladder, and a large indwelling catheter was inserted to drain the bladder suprapubically. Two very small diverticula were left untouched, as they were not likely to cause any troublesome symptoms, and as the patient had already been submitted to a lengthy operation. Dr. Davidson added that the patient had recovered from the post-operative shock, and the only troublesome feature in convalescence was the severe and constant abdominal distension which became evident within a few hours of the operation and had persisted in some degree for about three weeks. During the first week the condition was treated by injections of 0.1 gramme of acetylcholine at an interval of four hours, with definite but temporary relief. Enemata or the action of the bowel had been relatively ineffective, and the distension gradually disappeared when the patient was able to move about freely. Continuous suction drainage of the bladder was conducted after the removal of the tube, and the wound healed satisfactorily except for the persistence of a very small suprapubic fistula.

Dr. Davidson said that the patient was still, at the time of the meeting, unable to enjoy normal micturition, and that the difficulty appeared to lie in an apparent inability to start off the act of micturition. That power seemed to be present, though not of normal strength, and on occasions a good stream of urine had been passed. The bladder musculature was able to contract sufficiently at will, and during a bladder wash-out the water could be forced up the tubing into the funnel when held about a foot above the level of the bladder. By cystoscopy he had been able to prove that the incisions in the bladder wall had healed satisfactorily and that there was no obstruction at the bladder neck. He had attempted to study the action of the sphincter with the urethroscope in position, and the sphincter on that occasion had appeared to be absolutely inert. That fact and a consideration of the nerve supply of the bladder had given him the impression that the inability of the sphincter to relax at least in part accounted for the difficulty in starting the act of micturition. He had initiated treatment designed to stimulate the parasympathetic nervous system. Acetylcholine had been used for a few days without much success, but "Esmodil" (Bayer) had appeared to produce more encouraging results.

Dr. Davidson asked for an expression of opinion as to the advisability of resection of the presacral or hypogastric nerves if the patient's condition failed to improve, as removal of the "brake" effect might allow weakened parasympathetic nerves to stimulate the detrusor mechanism unhampered by the tonic effect of uninjured sympathetic nerves. He had considered the possibility of *spina bifida occulta* as a cause of weakened parasympathetic nerves, and had recognized the difficulty in excluding that possibility. If time and the use of drugs did not produce an improvement and if experimental surgery was refused it might become necessary, with disappointment and regret, to carry out permanent cystostomy.

Dr. J. THOMSON TAIT said that though Dr. Davidson had described the result as disappointing, really the reverse was the case. He had seen the lady and had told her that she would recover completely within twelve months. Diverticula of the bladder occurred rarely in women, and were almost certainly of congenital origin. The difficulty in the case under consideration arose from the multiplicity of the diverticula present. Dr. Tait did not think that the nervous disability in the mechanism of the act of mic-

turition need be postulated to account for the patient's present condition, but education of the detrusor mechanism took time to produce results. He congratulated Dr. Davidson for tackling such a difficult case and for the excellent recovery the patient had made, and advised him to be optimistic about the ultimate result.

Dr. J. B. SOMERSET spoke about the question of presacral neurectomy. While in London he had seen two patients with primary atony of the bladder upon whom that operation had been performed with temporary improvement followed by fairly rapid relapse, which was attributed to sepsis. The sepsis present in the case of Dr. Davidson's patient was alone a contraindication. The secondary atony was likely to be due to long-continued over-distension, and prolonged bladder drainage should be continued before any neurosurgery was considered.

Dr. VICTOR STONE suggested that Dr. Davidson should make a renewed attack on the sepsis with urinary antiseptics and use a self-retaining catheter to empty the bladder and keep it emptied for a couple of weeks. If those measures were adopted Dr. Stone thought that considerable improvement would follow. He had seen only one case in which presacral neurectomy had been performed for a similar condition, and it had not proved a success.

Renal Tuberculosis.

Dr. Davidson also showed a male patient, eighteen years of age, who had come under notice on account of nocturnal frequency of micturition of three weeks' duration. One week after the onset blood appeared in the urine. He had not lost any weight, nor had he had any shivering or sweating attacks. When an examination was made *per rectum* a nodule was found above and to the left of the prostate gland. Gross pyuria was present, but no tubercle bacilli or other organisms had been identified, in spite of repeated searches. By means of pyelography Dr. Davidson had been able to demonstrate that the calyces of the right kidney were distended. In other respects the examination failed to reveal any abnormality. Dr. Davidson was inclined to diagnose renal tuberculosis, and asked for expressions of opinion on that point and on other investigations considered necessary.

Dr. J. THOMSON TAIT said that he too would diagnose tuberculosis. Genito-urinary tuberculosis was not uncommon in Victoria, but the resistance of the patient to it was as a rule very great. It was frequently difficult to find the specific bacilli. Dr. Tait recalled that in similar circumstances it had taken him two years to be certain that an elderly patient had tuberculous disease of the kidney; one day three of the bacilli had been identified in a stained microscopic preparation following upon a long series of fruitless searches. In the case to which he had referred a guinea-pig had been inoculated with a heavy urinary deposit, but it survived and remained quite healthy. After the patient's tuberculous kidney was removed he had taken his guinea-pig home with him as a pet. Dr. Tait contrasted the very low local virulence of the condition with the very great virulence in a country such as France. He expressed the opinion that renal tuberculosis affected both the kidneys of Dr. Davidson's patient and advised Dr. Davidson not to undertake any further cystoscopy or pyelography for some time. He also suggested that a specimen of the patient's urine should be sent to Dr. Reginald Webster at the Children's Hospital, who was doing special research work on the recovery and identification of the strains of tuberculosis. Dr. Webster was specially likely to be successful in establishing the diagnosis, and was looking for the receipt of tuberculous material from all sources. Dr. Tait added that steps should be taken to build up the general resistance of the patient, who should live hygienically in the best possible environment.

Dr. J. B. SOMERSET said that, judging from the pyelogram shown by Dr. Davidson, the right side already had appearances very characteristic of tuberculosis. Hydronephrosis and hydronephrosis rather than primary dilatation of the

calyces were some of the characteristics to which he referred, and he thought that it was very probable that the condition was already bilateral.

Dr. G. A. PENINGTON emphasized the desirability of concentrating attention on the probability of the presence of tuberculosis elsewhere in the body rather than on the local condition alone. A series of skiagrams of the chest should be prepared in an effort to establish the integrity of the lungs before it could be presumed that they were not affected. Treatment should be directed not only to the avoidance of local lowering of resistance and to improvement in general resistance, but also to the improvement of the local tissue reaction. "Solganol" might be quite useful in dosage very much smaller than that recommended by the manufacturers, and should be continued at regular intervals for several months, followed by a long interval without injections. Dr. Penington said that he preferred the aqueous rather than the oily suspension, and he thought that the interval between injections should be sufficiently long to allow of the manifestation of a harmful reaction. He stressed the necessity for using extremely small injections and for graduating them upwards in size very slowly until ultimately as much as 0.5 or even 1.0 gramme might be injected without any harmful reaction. Unless it was given in very minute dosage, Dr. Penington regarded injections of tuberculin as potentially dangerous in the type of case under consideration. If it was desired to use tuberculin, "P.T.O.A." in very minute dosage was not likely to be harmful. An additional advantage of the institution of a course of treatment by injections was that the patients were induced to come along regularly to the doctor, who could keep them under close control.

Dr. J. G. R. FELSTEAD suggested that it might be possible to puncture the nodule in or near the prostate by means of a trochar and cannula, with the object of obtaining some biopsy material to be used in a further attempt to establish the diagnosis.

Dr. Davidson thanked those who had contributed to the discussion, and remarked that he was inclined to fear the dangers of infection if he followed Dr. Felstead's suggestion.

Impacted Ureteral Calculus.

Dr. Davidson also showed a male patient, thirty-five years of age, upon whom he had operated for the removal of a calculus impacted in the right ureter. He discussed the pyelograms and recounted the subsequent progress, which had been very satisfactory.

Dr. J. THOMSON TAIT said that the interest in such a case was the consideration of the length of time that a stone could or should be left in one position with safety. In the case of Dr. Davidson's patient eight weeks had proved to be a safe period. Dr. Tait thought that three months, and not six months, was the maximum period that a stone should be left in any one position.

Myositis Ossificans.

Dr. H. E. PEARCE showed a male patient, nineteen years of age, who at the end of June, 1937, had injured his arm playing football. When he came under observation two weeks later he was unable to extend the arm completely at the elbow joint, and a hæmatoma was present in the biceps muscle. Dr. Pearce showed a series of skiagrams to illustrate the development of *myositis ossificans* and its gradual retrogression with the passage of time. Treatment had comprised local applications of heat and controlled active movements. He thought that the gratifying progress of the patient would be of interest in view of the advice frequently found in text-books concerning the necessity for immobilization and rest.

Dr. BRYAN KEON-COHEN said that the position of the *myositis ossificans* was unusual, but that when the condition occurred in the usual position it was his experience that by far the best results were obtained by immobilization and repeated radiography as an aid in control and guidance as to the duration of the rest period. If the affected area did not clear by absorption, the treatment

by immobilization resulted in a delimitation of the trouble, and if necessary the deposit could ultimately be removed surgically. He would be inclined to warn his colleagues against passive movements in *myositis ossificans* in the region of the elbow joint.

Delayed Union of Fractures.

Dr. Pearce also showed a male patient, thirty years of age, who had sustained multiple fractures on December 26, 1937. The femur, tibia and fibula of one leg had been fractured; and, though the fibula had united, union of both the femur and the tibia was delayed, and the patient was still bed-ridden at the time of the meeting. Dr. Pearce invited discussion on further treatment.

Dr. BRYAN KEON-COHEN said that he was very interested in the condition of Dr. Pearce's patient. As the patient had been in bed for twelve months something should be done to get him up in spite of the lack of union. His advice was to get him up in a caliper splint and within two months union might progress satisfactorily, as the nutrition in the bones would be better. A bone graft operation later was more likely to be successful; but as the fibula had united, resection of about one inch of the fibula might be needed before union of the tibia could be expected. Dr. Keon-Cohen added that gross oedema of the foot and leg could be anticipated when the patient got up, and firmly applied "Elastoplast" should be used to minimize the oedema and the resultant discomfort.

Dr. W. R. ANGUS said that in his opinion the laziness of the osteoblasts accounted for the non-union, and operations had the stimulating effect of blood clot on the osteoblasts. In a somewhat similar case, after failure of union subsequent to getting the patient up in plaster, he had exposed the site of the fracture, freshened the bone and put in bone chips and had still failed to get union. He had then acted on the suggestion made by Dr. Felstead, to use nails to assist union. He had driven two oval-shaped ordinary nails criss-cross through the bone above and below the fracture and had got the patient up with the fracture nailed together. Three weeks later he had been able to pull the nails out and had nailed the fracture up again. In a series of skiagrams progressive evidence of union was obtained for a period of twelve months and the further course of the condition had been quite satisfactory. He suggested the use of a caliper splint for support; the femur should be left alone and the tibia should be nailed up. The patient should then be encouraged to walk, and Dr. Pearce should see what happened before making further plans.

Dr. J. G. R. FELSTEAD said that he had been in the habit of using carpenter's nails and had left a few in position. In the case under discussion he suggested that drill holes might serve the same purpose and that multiple drilling might be carried out straight away and the use of nails reserved until later if necessary.

Poliomyelitis.

With the object of stimulating a discussion on stiffness of the joints in poliomyelitis, Dr. C. E. RICHARDSON had collected together three children from among those infected in the Ballarat district during the 1938 epidemic. Two of the children had at one stage been in a dangerous condition as a result of paralysis of the respiratory muscles and had received treatment in respirator cabinets.

Dr. F. KINGSLEY NORRIS thanked Dr. Richardson for drawing attention to the point, as similar cases were appearing all over Victoria, and the condition could be regarded as a debit of respirator cabinet treatment. Another debit still to be seen at the Infectious Diseases Hospital at Fairfield was the gross residual damage which made one regret at times that the affected children had survived. It was because of the inability to treat suitably the limbs of the patients while they were undergoing treatment in the respirator cabinets that Professor Burstal had invented the jacket respirator. That type of jacket

respirator had the disadvantage of being in one piece, and Mr. Lewis had devised a bivalve jacket respirator with attached appliances for fixation and positional treatment of the limbs which left the patient accessible to the doctor and to the nurse. In certain instances the joint stiffness could be ascribed to the delay in early treatment. There had been a great deal of confusion about Sister Kenny's work, but in the reports on it attention had been focused on the methods that were being used, and particularly on the early treatment, the minimal use of splinting, and on the advantages of hydrotherapy. Dr. Norris expressed the opinion that it was not true that slight movement to muscles prejudiced their recovery, and indeed some of the difficulties were undoubtedly due to prolonged splinting and absence of movement. There was probably an ischemic factor as well—a vasomotor disturbance additional to the motor paralysis. Dr. Norris referred to two patients at Bendigo who could not be fitted into the Burstal jackets because the arms of the patients could not be moved from the side of the body. It was of interest to note that, in spite of systematic movements comparatively early in treatment, one of the patients shown by Dr. Richardson had developed stiffness of the joints.

Dr. BRYAN KEON-COHEN stated that modern orthodox treatment included the putting of all the joints through a range of passive movement as soon as the early acuteness of the condition commenced to wear off. He regarded the limitation of movement in the type of case shown by Dr. Richardson as due to extraarticular causes. Dr. Mills at Carshalton had said that they were endeavouring to combat an ischaemia and that the pain in the early stages was vasomotor ischaemic pain. Dr. Keon-Cohen added that the prognosis was excellent and that with active movement and a little passive stretching the stiffness should be overcome.

Miscellaneous.

Dr. J. C. DOUGLAS arranged a group of patients to illustrate external and internal diseases of the eye.

Dr. W. R. GRIFFITHS demonstrated from a series of gynaecological cases.

Dr. M. H. B. ROBINSON showed a patient with involvement of the temporo-mandibular joint following teeth extraction and sepsis.

THE KATHERINE BISHOP HARMAN PRIZE.

THE Council of the British Medical Association is prepared to consider an award of the Katherine Bishop Harman Prize in the year 1940. The value of the prize is £70.

The purpose of the prize, founded in 1926, is the encouragement of study and research directed to the diminution and avoidance of the risks to health and life that are apt to arise in pregnancy and child-bearing. It will be awarded for the best essay submitted in open competition, competitors being left free to select the work they wish to present, provided this falls within the scope of the prize.

Any medical practitioner registered in the British Empire is eligible to compete.

Should the Council of the Association decide that no essay submitted is of sufficient merit, the prize will not be awarded in 1940, but will be offered again in the year next following this decision, and in this event the money value of the prize on the occasion in question shall be such proportion of the accumulated income as the Council shall determine. The decision of the Council will be final.

Each essay must be typewritten or printed in the English language, must be distinguished by a motto, and must be accompanied by a sealed envelope marked with the same motto and enclosing the candidate's name and address.

Essays must be forwarded so as to reach the Secretary, British Medical Association House, Tavistock Square, London, W.C.1, not later than December 31, 1938.

Inquiries relative to the prize should be addressed to the Secretary, G. C. Anderson, British Medical Association House, Tavistock Square, London, W.C.1.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Numbers 2, 5, 8 and 9, of January 12 and 26 and February 16 and 23, 1939.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH (SEA GOING FORCES).

Clive Laurence Statham is appointed Surgeon Lieutenant for the period of three years from 23rd January, 1939, under the provisions of the Naval Forces Regulations.

Loan to Royal Navy for Service and Training.—The following officer is loaned to the Royal Navy for the purpose of service and training: Surgeon Lieutenant-Commander Henry Woodall Gault, to date 27th February, 1939.

The loan of the following officer to the Royal Navy for the purpose of service and training is terminated: Surgeon-Commander Francis Joseph Matthews, dated 2nd December, 1938.

CITIZEN NAVAL FORCES OF THE COMMONWEALTH.

Royal Australian Naval Reserve.

Harry Douglas Raffan is appointed Surgeon Lieutenant, dated 1st January, 1939.

AUSTRALIAN MILITARY FORCES.

First Military District.

Australian Army Medical Corps.

To be Captain (provisionally) supernumerary to establishment pending absorption.—Alan Kenneth Green, 12th December, 1938. Major F. G. Scoles to be brought on the authorized establishment, 2nd December, 1938; the provisional appointments of Captains R. Wallace and C. F. Marks are confirmed.

Captain (provisionally) D. G. Picone is transferred to the Reserve of Officers (A.A.M.C.) and to be Honorary Captain, 29th December, 1938.

Australian Army Medical Corps Reserve.

To be Honorary Major.—Edward Denis Ahern, 4th January, 1939.

Second Military District.

District Base: Staff.

Colonel R. W. W. Walsh, D.S.O., V.D., Australian Army Medical Corps, is reappointed Deputy Director of Medical Services, 2nd Military District, 1st January, 1939.

Australian Army Medical Corps.

Captains (provisionally) T. F. Rose and H. A. McCredie are transferred to the Reserve of Officers (A.A.M.C.) and to be Honorary Captains, 17th December, 1938, and 1st January, 1939, respectively.

To be Captain (provisionally).—Thomas John Ritchie, 5th December, 1938. *To be Captains (provisionally) supernumerary to establishment pending absorption.*—William Vincent Russell, 6th December, 1938; Joseph McDouall Mack, 7th December, 1938; Joseph Davis, 14th December, 1938; and Gregory Stephen Flynn, 15th December, 1938. Captain (provisionally) M. R. Joseph is seconded for a period of two years from 29th January, 1939.

Australian Army Medical Corps Reserve.

To be Honorary Lieutenant.—John Henry Palmer, 21st November, 1938.

To be Honorary Captain.—George Alexander Thompson, 30th December, 1938; the resignation of Honorary Captain L. G. Teece of his commission is accepted.

To be Major.—Alexander Kenneth MacLachlan, 1st December, 1938.

Third Military District.

Australian Army Medical Corps.

To be Captain supernumerary to establishment pending absorption.—Cecil Gordon McAdam, 22nd December, 1938. Captain (provisionally) C. P. Manson is brought on the authorized establishment, 1st December, 1938.

Captain (provisionally) H. R. Smith to be brought on the authorized establishment, 1st December, 1938.

The resignation of Major W. L. B. Stephens of his commission is accepted, 30th November, 1938.

Fourth Military District.

Australian Army Medical Corps.

Captain A. L. Dawkins ceases to be seconded and is borne supernumerary to establishment pending absorption, 20th January, 1939.

Fifth Military District.

Australian Army Medical Corps.

Captain (provisionally) R. J. Wheeler to be brought on the authorized establishment, 1st November, 1938.

Captain H. M. Trethowan is seconded for a period of two years from 7th December, 1938.

The resignation of Captain A. B. Anderson of his commission is accepted, 31st October, 1938.

Honorary Captains M. L. Kreitmayer and J. L. Day are appointed from the Reserve of Officers (A.A.M.C.) and to be Captains (provisionally) supernumerary to establishment pending absorption, 19th December, 1938, and 29th December, 1938, respectively. Captain (provisionally) J. D. Palandri is brought on the authorized establishment, 8th November, 1938.

Lieutenant-Colonel D. S. Mackenzie, D.S.O., is transferred to the Unattached List, 1st January, 1939.

Sixth Military District.

Australian Army Medical Corps.

Captain K. B. Redmond is retired.

Australian Army Medical Corps Reserve.

To be Honorary Lieutenant.—Russell Oliver Lyons, 28th November, 1938.

ACTIVE CITIZEN AIR FORCE.

Medical Branch.

Frederick John Clark, M.B., B.S., F.R.A.C.S., to a commission with the rank of Squadron Leader, 1st March, 1939.—(Ex. Min., No. 55.)

Obituary.

EDMUND BRUCE MORTIMER VANCE.

WE are indebted to Dr. H. A. Sweetapple for the following appreciation of the career of the late Dr. Edmund Bruce Mortimer Vance.

The death of Dr. E. B. M. Vance on January 21, 1939, has left a large number of friends with a sense of personal loss. Unlike so many who practise the despotic profession of medicine in these days, he found time to indulge his natural tastes in the acquisition of a broader culture, and

this taste for art in its various forms was as much a part of him as his interest in medicine. An appreciation of his character would be incomplete without a realization of the essential unity of his various activities.

He was always anxious to improve his knowledge and did not allow the need of earning his living to interfere with these pursuits. He graduated at Sydney in 1911 and spent a year at the Royal Alexandra Hospital for Children and a second year at the Coast Hospital as resident medical officer. Thus equipped he commenced practice at Leeton, where his worth was quickly appreciated. But the urge to improve himself in his profession carried him off to England for further post-graduate study after two years of general practice. He arrived back in Australia in the week in which war was declared, and when his only brother was killed in action in 1915 Dr. Vance enlisted.

He served with the Australian Imperial Force in Palestine from 1916 to 1919, and he told me that the foot disabilities of the troops first turned his mind towards his future specialty. So he returned to his practice at Leeton, and to conduct personally a small patient with infantile paralysis to Melbourne for Colin MacKenzie's advice shows the trend of his thoughts. He saw in MacKenzie's methods of muscle reeducation the solution to many of his previous problems in war surgery as well as in the accidents and diseases of civil life. He remained an ardent admirer of his famous colleague, and his appreciation of MacKenzie, written to this journal only a few months ago, is as revealing of the author as of the subject. He had been back in Leeton for four years when an advertisement in *The British Medical Journal* told him of the proposed course of study at Liverpool for the mastership in orthopaedic surgery. This was the tide in his affairs which he took at the flood and which led on to the realization of his ambition. He was the only student to take this course in 1924, and received continuous personal tuition from Sir Robert Jones for twelve months, not only at hospital, but also in Jones's private practice. What must have been the inspiration to Dr. Vance of this constant association has been discernible in his work ever since.

Dr. Vance's admiration for Sir Robert was apparently reciprocated, for a personal letter to Sir Alexander MacCormick, urging that his special training and attributes should be fully availed of in this country, ends thus:

I should be very sorry indeed to say anything half so enthusiastic about a man I did not so fully believe in.

I remain,

Ever your friend,
Robert Jones.

Dr. H. O. Lethbridge writes:

I find it hard to realize that Joe Vance cannot keep his appointment to ride with me in my 1911 Delage at the Leeton Silver Jubilee. He was the first resident doctor,

excepting a man who only lasted a few months. I had visited there weekly in the old "buggy and pair" days, and Joe came in with the transition to cars. We met often at the first Leeton Hospital, an affair of hessian walls and antbed floor, where, with Sister White in charge, Joe did good work. Keen, kind and thorough, he belonged to that class of general practitioner in the country who was invaluable to the community and entirely forgetful of self-interest. Having enlisted in the Light Horse, our ways parted. On his return he decided to specialize. Surely he had gained an invaluable asset in the years of general practice. He returned a fanatic admirer of "The Master", as he called Sir Robert Jones.

His orthopaedic work was carried on in spite of a progressive cardiac disability. One incident I recall that gives evidence of his powers of seeing the grain amongst the chaff. He was one of our delegates at the time that a conference was being held at Cootamundra, between representatives of hospital committees, as they then were, and medical delegates. Joe sat with both eyes shut, as was his wont, listening to a lay president who proclaimed the services hospitals were to the community. Joe rose wearily and, glancing through partially open lids, said: "Gentlemen, it would appear necessary to remind you that your doctors are your hospitals."

Dr. John Hoets writes:

Patients, students, nurses, masseuses and colleagues all feel a deep sense of personal loss on the passing of Vance. What a lovable chap he was!

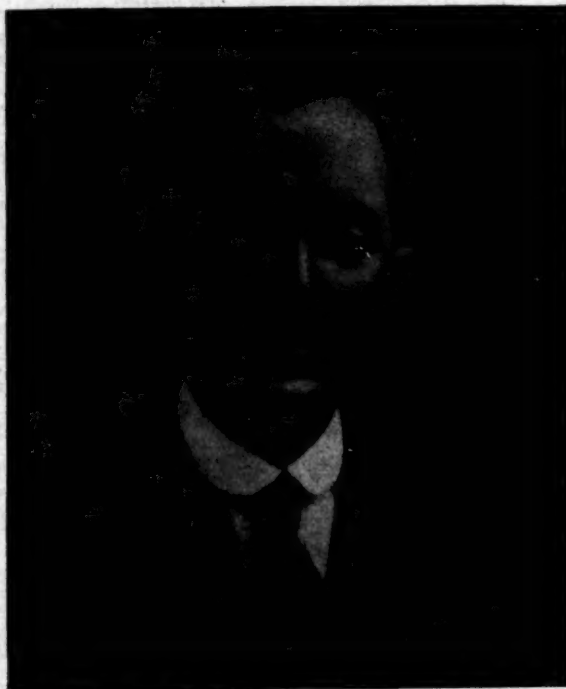
I don't know anyone who came in contact with him who did not fall in some degree under the spell of his whimsical charm.

The drooping eyelids, giving the impression of sleep, the hesitant speech, suggesting perhaps some uncertainty of thought, the diffidence and modesty of the spoken word, hid the twinkling eye of the humorist, the wisdom of a

philosopher, and a firm, clear-cut and well-considered opinion based on his thorough training in orthopaedic surgery and a great clinical experience. But greater than his sense of humour, knowledge, wisdom and clinical skill was his courage.

To those of us who knew what was hanging over him, and knew that he too knew, the later years of his life have been an amazing example of fortitude. He would not be the invalid. Orthopaedic work is strenuous and exacting, and although he was happy in having a colleague in close association who could and did save him much physical exertion, he would not shirk. Time and time again his assistants, knowing he was not well, would try to shield him from exertion by keeping a patient out of his sight. Vance would notice the omission from his list, and insist on doing his best for the sufferer. This, too, not in the case of a well-to-do private patient, but at his out-patient clinic at hospital, knowing full well that every manipulation he performed had to be dearly paid for by himself. What an example to those of us who feel an out-patient clinic at times an intolerable burden even in good health!

His interest in his work was never dimmed, and his active participation in meetings of orthopaedic societies



continued as long as he was physically capable of attending. His own contributions always bore the stamp of a culture much higher than that to which the average medical man attains. Orthopedic surgeons throughout Australia will miss him from their gatherings—an outstanding personality in their ranks.

We, his colleagues, share in some measure the grief of his family in their loss. We also share the richness of their memories of a very brave man, a wise and skilful surgeon, and a good friend.

WALTER BLAXLAND.

We regret to announce the death of Dr. Walter Blaxland, which occurred on February 27, 1939, at Sydney, New South Wales.

WALTER CHARLES MANSFIELD.

We regret to announce the death of Dr. Walter Charles Mansfield, which occurred on March 1, 1939, at Rose Bay, New South Wales.

Post-Graduate Work.

WEEK-END COURSE AT TAMWORTH.

THE New South Wales Post-Graduate Committee in Medicine announces that, in conjunction with the Northern District Medical Association, it will hold a week-end course at Tamworth on Saturday, May 6, and Sunday, May 7, 1939. The programme is set out hereunder.

Saturday, May 6.

At the Railway Hotel, Tamworth.

- 2 to 2.45 p.m.—"Causes and Treatment of Oedema", Dr. S. A. Smith.
- 2.45 to 3.15 p.m.—Discussion.
- 3.15 to 4 p.m.—"Gynaecological Diagnosis", Dr. F. A. Maguire.
- 4 to 4.30 p.m.—Afternoon tea.
- 4.30 to 5 p.m.—Discussion.
- 5 to 5.45 p.m.—"Headache", Dr. S. A. Smith.
- 5.45 to 6.15 p.m.—Discussion.
- 8 to 8.45 p.m.—"Gynaecological Operations, such as Internal Shortening, Repair of the Pelvic Floor or Hysterectomy" (with slides), Dr. F. A. Maguire.
- 8.45 to 9.15 p.m.—Discussion.

Sunday, May 7.

At the Railway Hotel, Tamworth.

- 9.30 to 10.15 a.m.—"Blood Pressure", Dr. S. A. Smith.
- 10.15 to 10.45 a.m.—Discussion.
- 10.45 to 11.15 a.m.—Morning tea.
- 11.15 a.m. to 12 noon.—"The Endocrine Glands in Gynaecology", Dr. F. A. Maguire.
- 12 noon to 12.30 p.m.—Discussion.

In the afternoon arrangements for golf will be made for those desirous of playing on the Tamworth links.

The fee for the course will be one guinea. Those intending to be present are requested to notify Dr. E. B. Fitzpatrick, 448, Peel Street, Tamworth, as soon as possible.

Correspondence.

THE SYME MEMORIAL LECTURE.

SIR: Sir James Barrett has drawn my attention to two inaccuracies in the account I gave of Syme's life in the recent Syme Memorial Lecture, and it would perhaps be best to publish his letter to me dealing with these points. As Sir James states, the second one is the more important error, and is believed by almost everyone. If it were true it would not stand to the credit of those high in command, and I am glad to be able to correct this.

Yours, etc.,

BASIL KILVINGTON.

Lister House,
61, Collins Street,
Melbourne.
February 20, 1939.

103-105, Collins Street,
Melbourne, C.I.
January 21, 1939.

Dear Kilvington,

I read your Syme Memorial Lecture with much interest. There are two slips which you might correct at some future date if you really think it worth while.

Moore was, I think, a year behind Syme and myself.

The quartette at tennis at FitzGerald's were Dr. Youl, Professor Allen, Sir T. N. FitzGerald, Syme and myself.

You can verify Moore's position from the Registrar of the University.

Syme was never put in charge of a venereal disease and measles camp. When it was formed he offered to take charge, but the commanding officer, Colonel Ramsay Smith, said: "I can't spare you, as I want you as principal surgeon in the hospital." How this story got about is beyond me, as I was present at the interview and, when consulted, entirely concurred with the commanding officer.

The first item is immaterial, the second more important.

Sincerely yours,

JAMES W. BARRETT.

Dr. Basil Kilvington,
63, Collins Street,
Melbourne, C.I.

DRAINAGE IN ACUTE APPENDICITIS.

SIR: In the last number of *The Australian and New Zealand Journal of Surgery* an article appeared by Sir Alan Newton on "Drainage in Acute Appendicitis".

Recently this question has been given a good deal of prominence in different journals. The opinion and advice of a surgeon with the experience, ability and sound judgement which Sir Alan Newton undoubtedly possesses should not be disregarded, and he should certainly be supported when he advises that it is time the question of "drainage in acute appendicitis" be reconsidered.

As one who has operated on these cases for well over thirty years, I agree with his views entirely.

As a matter of fact, ever since I have been in practice I have carried out in every detail the method he adopts, including the muscle-splitting incision, and from personal experience have found this to be the best procedure to adopt. The risk of a drainage tube is greatly exaggerated. I have never yet regretted using one, and have always followed that motto, "when in doubt, drain", not merely for its hypnotic influence, but for the welfare of the patient.

A very soft-walled tube should always be used. If a hard and rigid one is pushed into the abdomen "somewhere" among the coils of intestine without being placed

in proper position, there is a grave risk of a fistula from pressure necrosis; but to my mind the usual cause of a fistula is where necrosis has extended along the appendix, involving the caecum, or from rough handling of adhesions.

A deep-seated residual or secondary abscess is usually the result of shortening the tube too soon, or its too early removal. It should be realized that there is no set day for the removal of the tube; this depends entirely upon the condition of the patient, the amount and nature of the discharge.

Some time ago, in an article, I gave a few hints to the inexperienced budding young surgeon. One was that when operating for acute appendicitis, if the index finger should strike pus and, unless the appendix happened to be "looking at you"—which very rarely occurred—the finger should immediately be withdrawn without doing any rabbiting about and a soft tube substituted. The operator would then have the satisfaction and pleasure in seeing his patient get well.

If he decided to remove the appendix later on, he would be surprised to find it in many cases almost normal, with perhaps only a constriction to mark the site of a perforation.

Yours, etc.,

G. A. HAGENAUER.

Sale,
Victoria,
February 20, 1939.

THE BRITISH MEDICAL ASSOCIATION IN AUSTRALIA.

SIR: Whither the British Medical Association in Australia? Is it destined to sink into oblivion, unhonoured and unsung, with a gloomy record of futility and failure? Or is it possible that it may yet be rehabilitated?

I feel that the prestige of the British Medical Association has never been so low as it is now, and, if the position is to be retrieved, strong action is necessary. If this fails, it would be best to let the British Medical Association die a natural death, and in its place to form another association with a higher sense of public duty, a firmer adherence to the ethical principles of the profession, and more progressive ideas.

We need not labour further the unhappy business of national insurance. Surely it is impossible to conceive worse handling of such an important matter, either by the Government or the British Medical Association. Happily it appears that national insurance is done; but no thanks for this are due to any official action of ours. The creation of a huge fund by the Federal Council or its Insurance Committee to conduct our case before the commission has inevitably led to loss of confidence in us by the public, which believes we are out merely to protect our own selfish interests. Seeing that the purpose of the fund is to fight an agreement made on our behalf by the Federal Council—an agreement unacceptable to the members and framed without consulting them in any way—surely the height of absurdity is reached. I suggest in all seriousness that individual members of the Federal Council should be asked to make good the deficit that is likely to be incurred in that matter.

But what of the future? We must learn from the errors of the past. Another act may be introduced, and we must be prepared. As an essential first step I urge that each and every Branch of the British Medical Association in Australia take immediate steps to secure an alteration of the Federal constitution, so that members generally, instead of members of Branch councils only, shall have the right to elect delegates to the Federal Council. It will then be their duty to select their representatives wisely and be prepared to give them loyal support. They must also take a more active interest in the affairs of the Association, and see to it that they obtain from their representatives a satisfactory account of their stewardship.

I have not yet completely given up hope for the British Medical Association in Australia. But it is very close to the rocks at present. Who will help to steer it clear?

Yours, etc.,

D. R. W. COWAN.

172, North Terrace,
Adelaide,
February 25, 1939.

Medical Prizes.

THE HUNTERIAN SOCIETY GOLD MEDAL FOR PRACTITIONERS.

ANY registered general practitioner resident within the British Empire is eligible to compete for the gold medal of the Hunterian Society, and the medal is awarded annually to the writer of the best essay on a subject selected by the society. Competitors, men or women, must be engaged in general practice, and essays should be sent in by December 31. The essay must be unpublished and original, and be based on the candidate's own observation, but it may contain excerpts from the literature on the subject, provided that reference be made to the articles from which they are taken.

A copy of the rules and any further information can be obtained on application to the Honorary Secretary, Mr. Alex E. Roche, 140, Harley Street, London, W.1.

The subject selected for the essay is: 1939, "Treatment of Obesity in General Practice"; 1940, "The Treatment of Tonsillar Infections in Children".

The 1938 Hunterian Gold Medal for General Practitioners was won by Dr. James E. Outhwaite, of Yeading, Leeds, for his essay on "The Management of Inoperable Malignant Disease in General Practice".

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned has been registered, pursuant to the provisions of the Medical Act, 1912 and 1915, of New South Wales, as a duly qualified medical practitioner:

Day-Lewis, Alfred Kay, M.R.C.S. (England), L.R.C.P. (London), 1919, c.o. R. Thomson and Company, 8, Castlereagh Street, Sydney.

NOTICE.

PROFESSOR J. C. WINDEYER, of the University of Sydney, has forwarded the following notice received by him from the University of Oxford.

First Assistant in the Department of Anaesthetics.

Applications are invited for the whole-time post of First Assistant in the Department of Anaesthetics. The successful candidate will be required to assist the Nuffield Professor of Anaesthetics at the Radcliffe Infirmary and to carry out research work in his department. The appointment will date from 1 May, 1939, or such near date as may be arranged, and will be terminable by three months' notice on either side. The salary offered is £600 a year.

Candidates, who must hold a medical qualification registrable in Great Britain, must send their applications and the names of three referees to The Secretary of Faculties, University Registry, Oxford, so as to reach him not later than Friday, 31 March, 1939. All inquiries about the post should be addressed to Professor Macintosh, Radcliffe Infirmary, Oxford.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Oldham, Jack Maxwell, M.B., B.S., 1939 (Univ. Sydney), Goulburn District Hospital, Goulburn.
Davidson, Charles Geoffrey, M.B., B.S., 1939 (Univ. Sydney), Sydney Hospital, Sydney.
Isbister, James, M.B., B.S., 1939 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Mulhearn, John William Harper, M.B., B.S., 1937 (Univ. Sydney), St. George District Hospital, Kogarah.

Diary for the Month.

MAR. 14.—Federal Council of B.M.A. in Australia (Melbourne).
MAR. 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAR. 14.—New South Wales Branch, B.M.A.: Ethics Committee.
MAR. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAR. 22.—Victorian Branch, B.M.A.: Council.
MAR. 24.—Queensland Branch, B.M.A.: Council.
MAR. 28.—New South Wales Branch, B.M.A.: Council (Quarterly).
MAR. 30.—South Australian Branch, B.M.A.: Branch.
MAR. 30.—New South Wales Branch, B.M.A.: Annual Meeting.

Medical Appointments.

Dr. G. R. Troup has been appointed an examiner to the Nurses' Registration Board of Western Australia.

Dr. D. T. M. Hayes has been appointed Honorary Medical Officer to the Barmera Hospital, South Australia.

Dr. G. V. Smith has been appointed an Honorary Medical Officer to the Port Pirie Hospital, South Australia.

Dr. E. Clement has been appointed a Medical Officer in the Medical Branch of the Department of Public Instruction of New South Wales.

Dr. A. G. C. Budge has been appointed a Medical Officer in the Medical Branch of the Department of Public Instruction of New South Wales.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xvi to xviii.

ALFRED HOSPITAL, MELBOURNE, VICTORIA: Honorary Officers.
DEPARTMENT OF PUBLIC HEALTH, MELBOURNE, VICTORIA: Health Officer.

LAUNCESTON GENERAL HOSPITAL, LAUNCESTON, TASMANIA: Junior Resident Medical Officer.

ROYAL PRINCE ALFRED HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Relieving Radiologist.

SAINT VINCENT'S HOSPITAL, MELBOURNE, VICTORIA: Assistant Medical Tutor, Assistant Surgical Tutor.

TARA DISTRICT HOSPITAL, TARA, QUEENSLAND: Medical Officer.

THE MOUNT MORGAN DISTRICT HOSPITAL, MOUNT MORGAN, QUEENSLAND: Resident Medical Officer.

THE TOOWOOMBA HOSPITALS BOARD, TOOWOOMBA, QUEENSLAND: Senior Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL, are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street Glebe, New South Wales. (Telephones: MW 2651-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognise any claim arising out of non-receipt of journals unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad per annum payable in advance.